SAMSUNG

2008 Appliance Products

ApplianceTechnical Training

Chapter 1

Samsung
Support Information

Support Contact Numbers

- Customer Service
  - 1-800-SAMSUNG (726-7864)
- Authorized Service Centers Tech Assist
  - 866-797-8736 (account number required)
  - Hours 9AM – 9PM Eastern Time
  - 11AM - 4PM Eastern Time Saturdays
  - Email technicalsupport@sea.samsung.com
- Non Authorized Service Centers
  - 201-584-0412- Fax service Only
- Warranty Assistance: 800-849-2198 option 8
- Web Site Assistance: 1-201-229-4177
- Web Site Assistance JayRJr@sea.samsung.com
- Training Requests training@sea.samsung.com
- Tech Talk Newsletter Subscriptions training@sea.samsung.com

- **G**lobal **S**ervice **P**artner **N**etwork http://service.samsungportal.com
- Login and Password Issues: Elisa Pagliaro epagliaro@sea.samsung.com
- **GSPN Content Issues:** Jim Foster jimf@sea.samsung.com

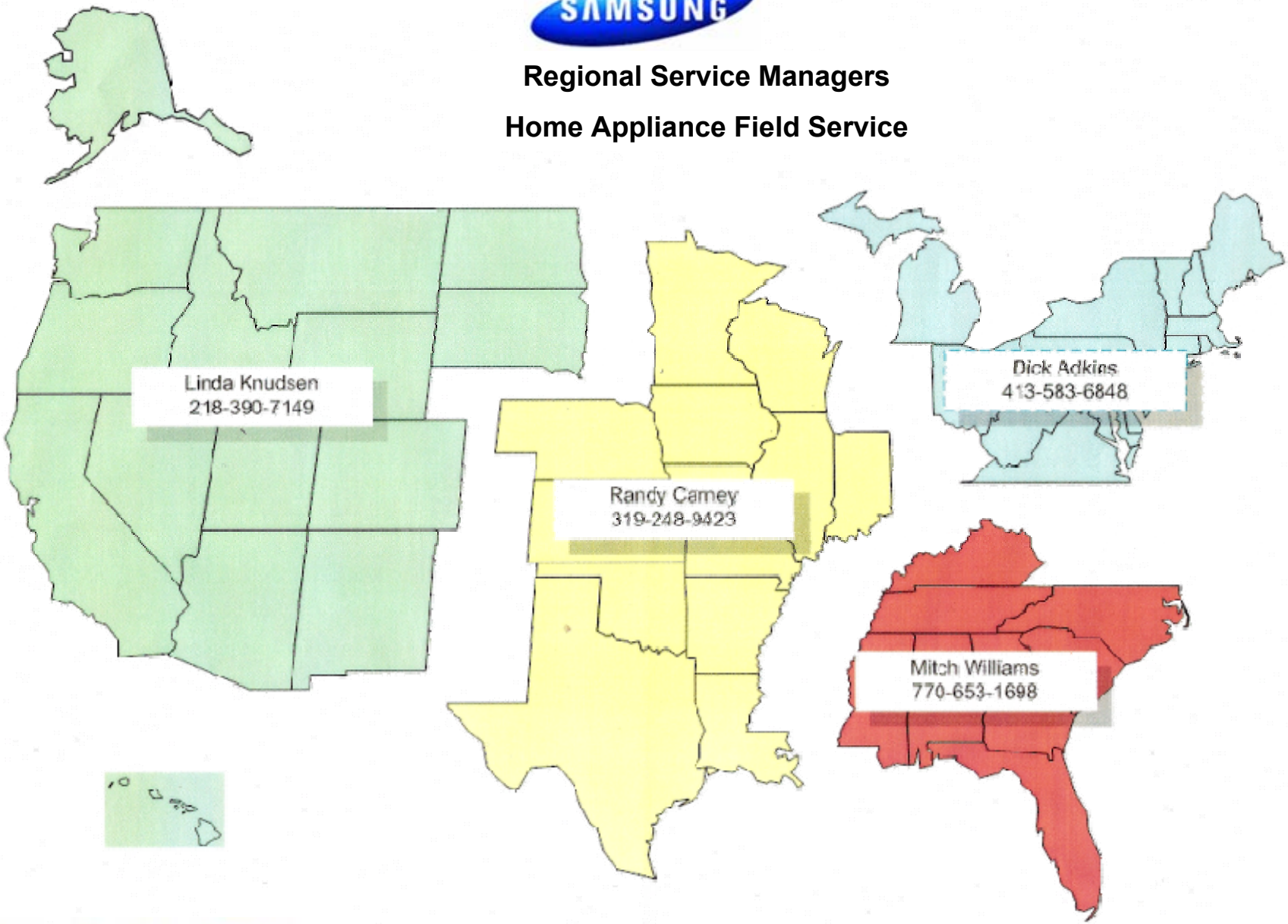
Parts can be ordered through:
Samsung **GPCA**
Global **P**arts **C**enter **A**merica
Parts ordering or backorders
800-634-8276
or you may use:

Marcone Appliance Parts
800-482-6022

marcone
BEST INVENTORY • BEST PRICE • SINCE 1932

Regional Service Managers

Home Appliance Field Service



Be Prepared When Calling for Technical Assistance on Appliances

Slow Times: 6-9 PM EST M-F; 11-4 EST Sat.
For prescreening calls

The technical assistance team needs four things when you call in, in this order:

- Your account number
- Product model number
- Product serial number
- Your name

Please remember, Laundry and Refrigeration products have a letter at the end of the serial number.

Ref & Laundry Serial Number Information

Model Name

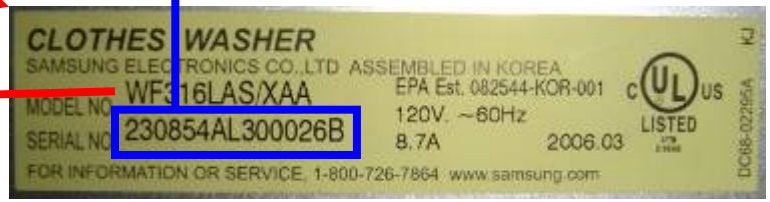
Production Line

Check Digit

6 3 5 5 4 3 C P 1 0 0 1 6 0 A

Pro. Year
Y : 2005
A : 2006 Jan
L : From 2006 Feb
P : 2007

Pro. Month
1~9 : Jan~Sep
A : October
B : November
C : December



Model Name

ApplianceTechnical Training

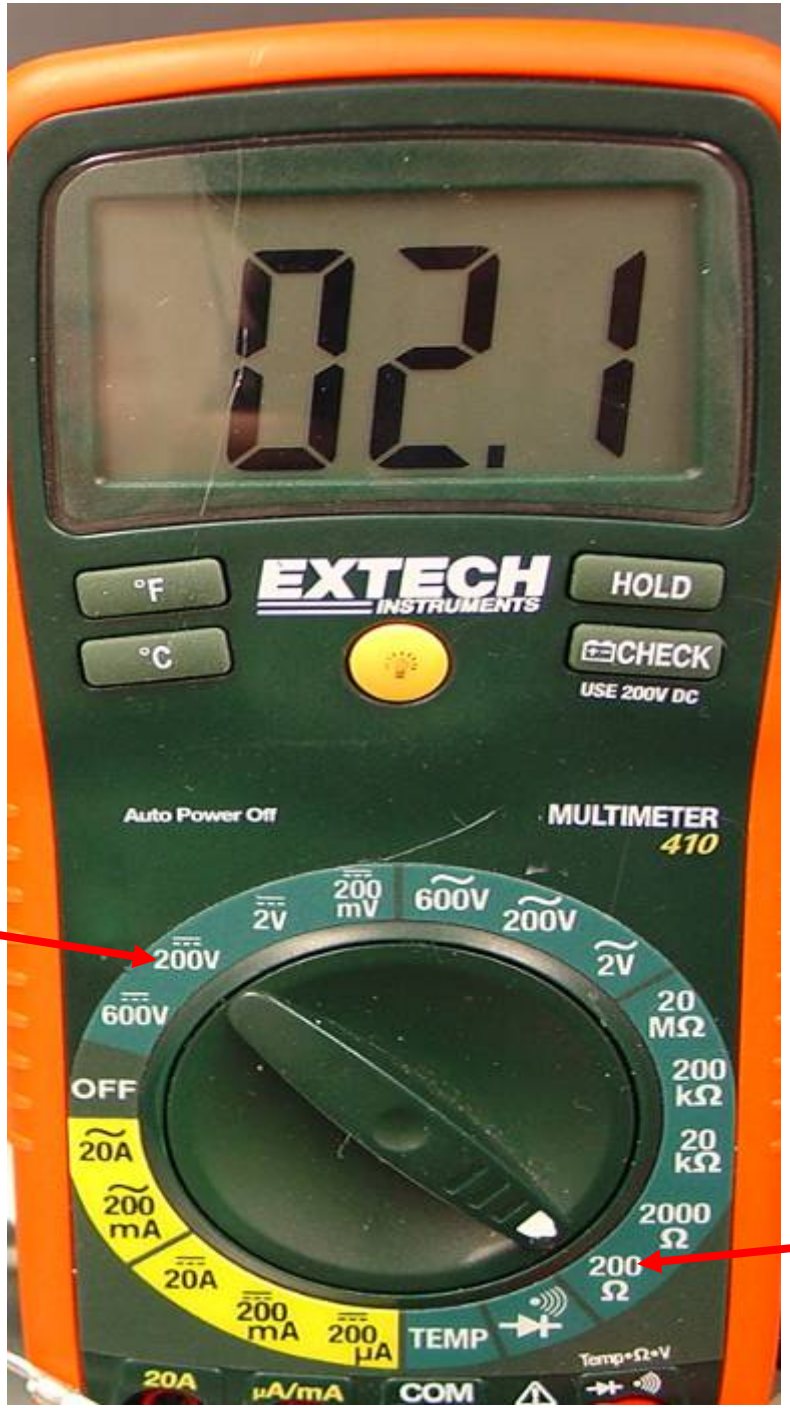
Refrigerator Model Number Nomenclature

- RS = Side by Side
- RF = French Door
- RM = Four Door
- RB = Bottom Mount Freezer

Technical assistance will not be able to help
unless you are properly prepared with tools when you are with the product.

- Multimeter requirements for appliance calls:
  - Accurately measure DC voltage to the hundredths of a volt (3.56vdc) from 1vdc to 24vdc with special meter leads or safety pins to read voltages at the small connectors on the main circuit board.
  - Accurately read resistance from 1 ohm to 200K ohms
  - Accurately read AC voltage from 16vac to 240vac
  - Replacement meter batteries!!!!!!
- Please have an instrument available to accurately measure freezer and refrigerator temperatures.
- An Amp Probe or Watt Meter would be an advantage.

Know your meter scales



Use for Sensor Voltage Tests Or 20 VDC scale on some meters

Use for Defrost Heater tests

REDO Prevention Tips

Samsung Electronics is currently focusing on reducing our repeat repairs (Redo). We have prepared the following tips for all of our Service Centers to follow so that we can improve our overall service to our mutual customers.

1. The technician should always talk directly to the customer before each call. Many techs get their idea of what's wrong via 2nd hand conversation, bring the wrong parts and put it in figuring doing something is better than nothing. This is a bad practice.
2. Ask the customer if there were any other symptoms before the current problem appeared.
3. If you do not see the defect during your visit and you are not sure what the problem is, do not guess on the repair. Confirm the symptom by picture, Technical support, or research on PVI website.
4. **Do not submit a claim using EADJ if no adjustments were actually performed because this will contribute to a REDO if a 2nd call is needed. Be sure to properly code the repair. See list of repair codes on the next page which do not affect the REDO rate.**
5. If you are 99% sure that one of two possible parts will repair the unit, change both parts. However, only do this when you are sure that this will repair the unit because one of our KPI is amount of parts used.
6. Spend time after the repair burning the part in (at least 20 min) and talk to the customer to make sure they are satisfied with the repair (not going to call back after you leave).
7. Please review your claim submission process to make sure that you are not submitting two claims for the same unit repair at the same time.

These are some of the habits of the best technicians in the country. The best technicians also concentrate on having the correct parts in stock by reviewing their weekly usage. If you have any other tips which you have found to be successful in reducing repeat repairs, please send them to your RSM.

Repair Codes Excluded from REDO calculation:

- CEST: Customer Refuse Estimate
- CLEA**:** Cleaning
- CLEN: Cleaning
- **CUST: Customer Education**
- DTYX: Dirty
- EXCP: EXCH-Company Policies
- EXES: EXCH-Excessive Service
- EXLW: EXCH-By law
- FACT: Factory Modification
- HOLD: Waiting for parts
- INST: Installation
- ISTL: Installation
- MACC: Missing Accessory

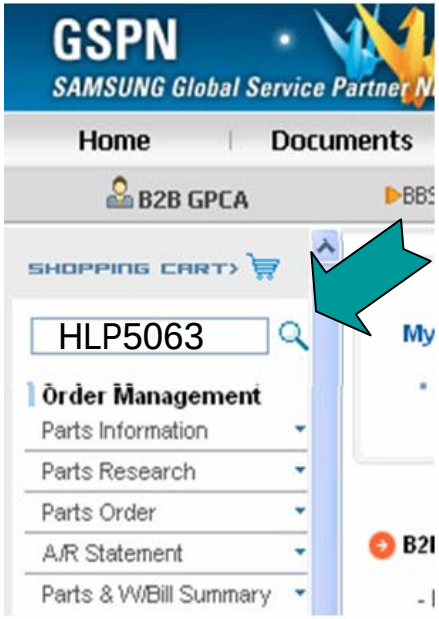
Samsung will pay the minor warranty rate for a customer education call ONE time for each consumer product while under warranty

- MISS: Missing
- MMCH: Mis-Match
- NPFD: No problem found
- NPRB: No problem found
- PANT: Paint
- RCON: Reconnect
- RECH: Recharge
- RECO: Reconnect
- RSTU: Reseat
- SCHX: Scratch
- SPEC: Specification measurement
- WSUP: Wrong Setup
- RCLL: Recall

If a initial warranty claim is submitted with one of the above repair codes and another repair is submitted within 90 days the service center is **NOT** charged with a REDO

Quick Document Search

1. From the Main Menu Select “Warranty/Parts”



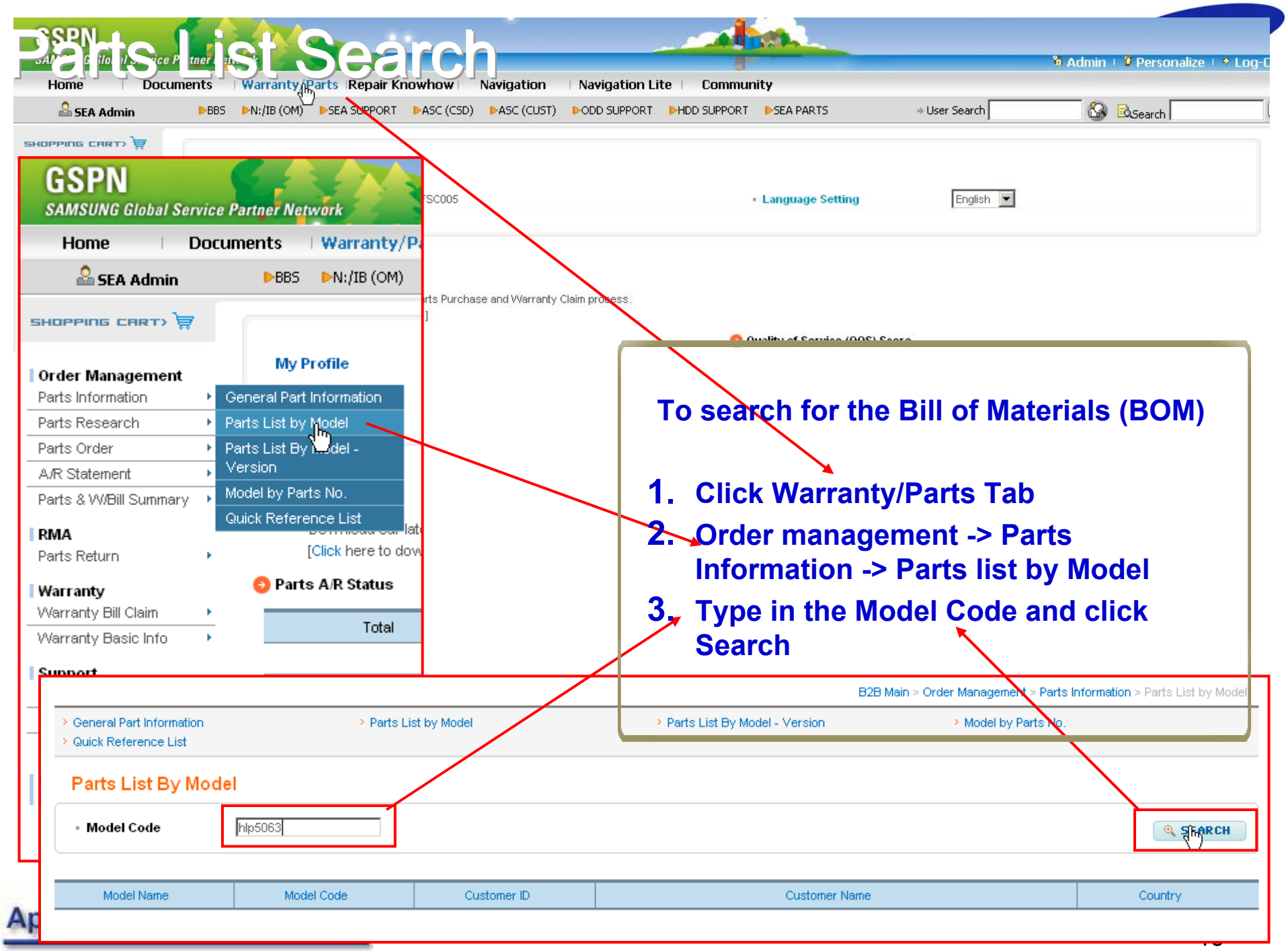
2. Type in the Model Number in the Left Hand Search Field

3. Click on the Magnifier Button

4. Manuals and Bulletins are displayed with appropriate hyperlinks

No	Model Code	Service Manual	Training Manual	User Manual	Service Bulletin	Service Tip	Driver	Firmware
1	HLP5063WX/XAA	1	1	1	12	16	0	0

Parts List Search



Bill of Materials Search Tip

Parts List By Model

Model Code: hlp5063 SEARCH

Model Name	Model Code	Customer ID	Customer Name	Country
HL-P5063W	HLP5063WS/XAA	0001141559	SAMSUNG ELECTRONICS	MX
HL-P5063W	HLP5063WS/XAA	0001246336	SEM-PPL CUSTOMER	MX
HL-P5063W	HLP5063WX/XAA	0001151600	SAMSUNG ELECTRONICS	US
HL-P5063W	HLP5063WX/XAC	0001151614	SAMSUNG ELECTRONICS	CA
HL-P5063W	HLP5063WX/XAC	0001151600	SAMSUNG ELECTRONICS	US
HL-P5063W	HLP5063WX/XAP	0001151600	SAMSUNG ELECTRONICS	US
HL-P5063W	HLP5063WX/XAP	0001151615	SELAP	PA
HL-P5063W	HLP5063WX/XAP	0001164089	SAMSUNG ELECTRONICS	CO

1

DOWNLOAD

1. **Click on the correct model code**
   (Check country list on right to make sure it is the right model)
2. **Check mark the parts you need and Click CREAT P/O or ADD TO CART**
3. **Service bulletins and tips can be found for the specific part**

☐	507	BP96-00678B	ASSY DMD BOARD P;L3,DMD BOARD,SERVICE	T0703	Active	522.26	0	NO
☐	508	BP96-00678D	ASSY DMD BOARD P;L3 PHILIPS,DMD BOARD,DM	T0703	Active	373.83	0	YES
☐	509	BP96-00678E	ASSY DMD BOARD P;L3 OSRAM,DMD BOARD,DMD	T0703	Active	351.09	0	YES
☐	510	BP96-00690A	ASSY BALLAST P;L3,SERVICE BALLST	T0751	Active	83.92	0	YES
☐	511	BP96-00822L	ASSY ENGINE P-DLP PWL6;50L6(AIR),PHILIPS	T0129	Active	1,034.3	0	NO
☑	512	BP96-00823A	ASSY LAMP P;L3,LAMP SERVICE,OSRAM 120W,E	T0888	Active	190	0	NO
☑	513	BP96-00824A	ASSY ENGINE P-DLP OML3;L3(FDB),OSRAM 120	T0129	Active	1,230.38	0	NO
☑	514	BP96-00826A	ASSY LAMP P;L3,LAMP SERVICE,PHILIPS 120W	T0888	Active	190	0	YES
☐	515	BP96-00852A	ASSY BALLAST P;L3 OSRAM,SERVICE BALLST	T0751	Active	116.76	0	YES
☐	516	BP96-00932A	ASSY BRACKET P-MIRROR;50L3,SECC	T0902	Active	43.73	0	NO
☐	517	BP96-00980A	ASSY SHIELD P-PCB;L3,L6,PCB-DMD,SPTE,T0.	M0112	Active	6.22	0	YES
☐	518	BP97-00825D	ASSY MICOM;L62B,29DL32,T-ATLNUS-1036,041	M0018	Active	32.77	0	NO
☐	519	BP97-00826A	ASSY MICOM;,L62B,29W800D,T-ATLOSMWWS-100	M0018	Active	11.71	0	YES
☐	520	BP97-00836A	ASSY MICOM;,L62B,29DL32,HD3_DMD_V3.0,200	M0018	Active	21.92	0	YES
☐	521	MD09-00137A	IC MICOM;P-PCFM-012,P-PCFM-012,32,5V,12M	T0119	Active	13.34	0	YES
☐	522	MD29-00011A	FILTER LPF;TH355LSK-K5243,0TO7MHZ,-30TO+	FT114,FT11	Active	8.11	0	NO

1

CREATE P/O ADD TO CART DOWNLOAD

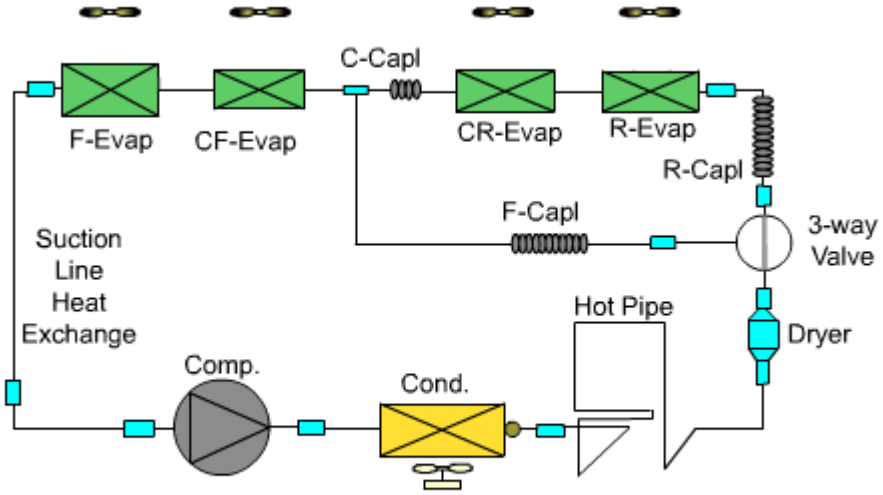
App

Chapter 2

Refrigerator Technology

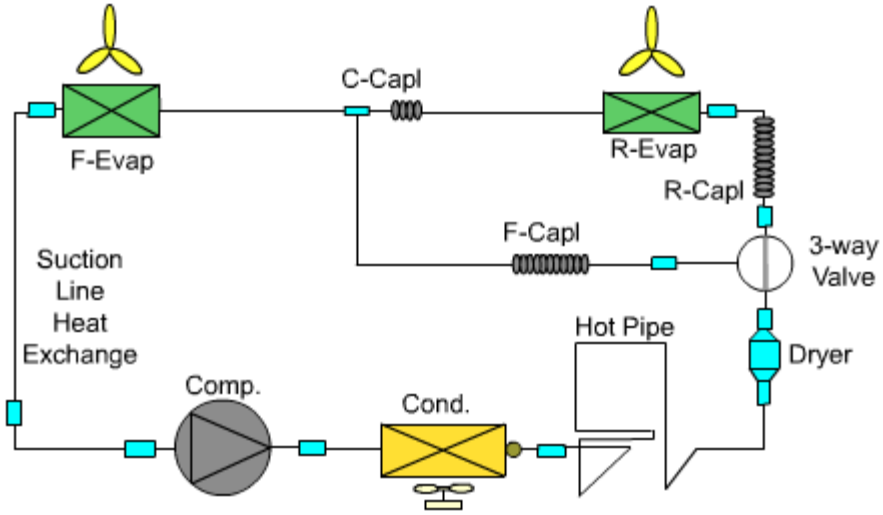
Dual Evaporator with TDM valve

The Time Divided Multi-cycle (TDM) System (Stepper Valve) is used to switch refrigerant flow in the 4 Door (RM25*) and French Door (RFG29*) This improves temperature control and energy efficiency.



Standard Mode Operation

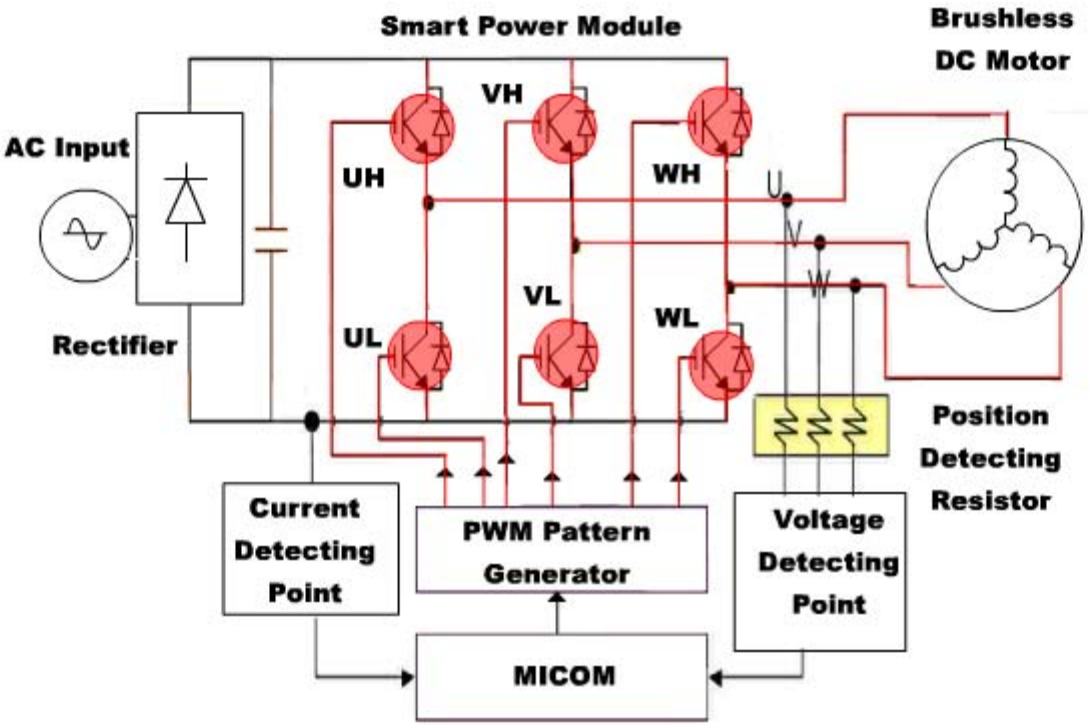
Quad Cooling RM Model



Standard Mode Operation

Twin Cooling RS/RF/RB Models

Inverter Compressor



Maximum Cooling Required

All Drive Transistors ON

Compressor spins at ~3500 RPM

Max Cool

this mode is accessed very rarely

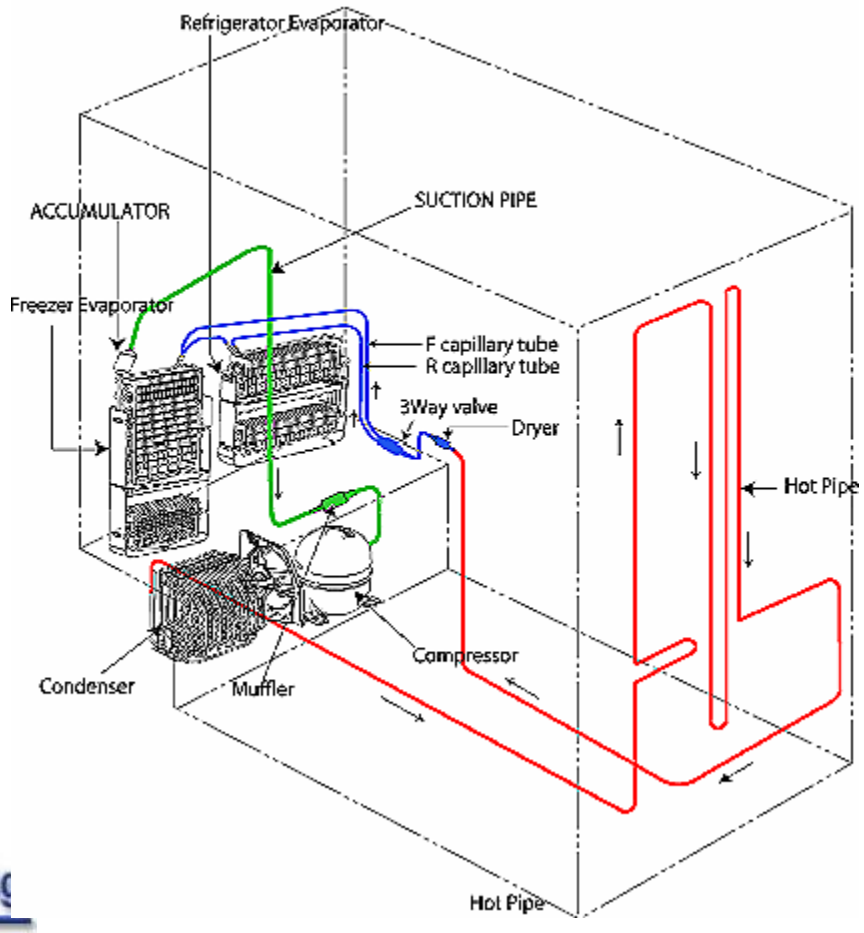
Inverter compressors offer energy savings not available in a standard compressor

Refrigerant Path

Compressor → Sub-condenser → Hot Pipe → Dryer → Step valve → R Capillary Tube → R/CR Evaporator → C Capillary Tube

Step valve → F Capillary Tube → C/CF Evaporator

C/CF Evaporator → Suction Pipe → Compressor



Chapter 3

Refrigerator Troubleshooting

Refrigeration Troubleshooting

- The Forced Operation Mode is a very valuable troubleshooting tool for testing compressor operation, fan operation and defrost operation.
- Forced Freeze Mode
  - The compressor is started without the 5 minute delay
    - You can check the compressor voltage at the main PCB in this mode.
    - You can accurately check defrost sensor voltages in this mode
  - All fans will be turned on in this mode, to allow voltage testing. The door switches still control the fan operation.

Refrigeration Troubleshooting

- Forced Freeze Mode Inverter Compressors
  - The compressor is started without the 5 minute delay
    - You can force the three speed options of this compressor
    - You can accurately check the temp and sensor operation
  - All fans will be turned on in this mode, to allow voltage testing. The door switches still control the fan operation.

Refrigeration Troubleshooting

- Forced Defrost Operation
  - Standard compressor models can activate the Fridge defrost only, or both the Fridge and Freezer defrost.
  - Inverter compressor models activate all heaters at once.
  - In the Forced Defrost Mode the defrost sensor still controls the heater operation. When defrost is activated the main PCB will turn over defrost control to the sensor in about 90 seconds If the defrost sensor reads a temperature above the shut off point it will tell the main PCB to turn off the defrost voltage.
  - Even when the defrost is turned off the unit will stay in the forced mode for up to 24 hours.

Refrigeration Troubleshooting

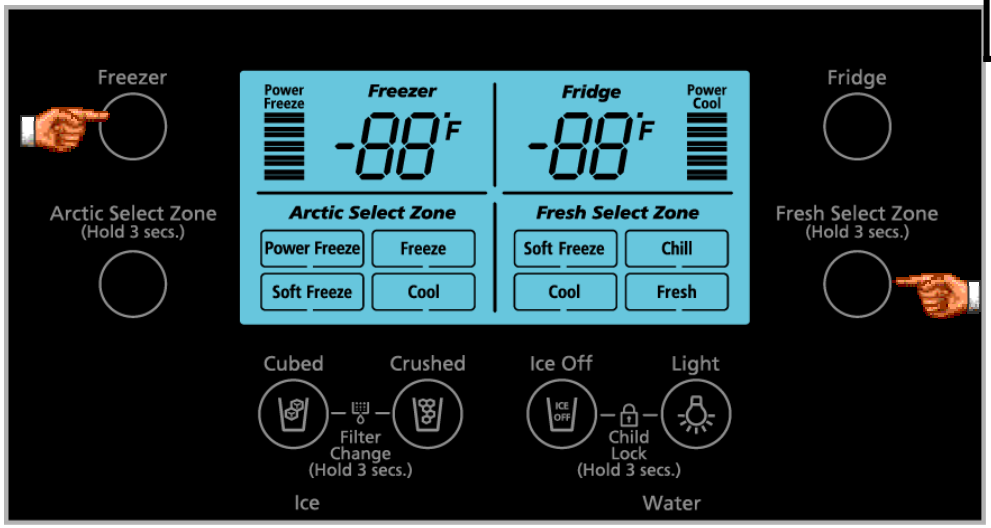
- Selecting the Forced Modes
  - When the two buttons are pressed together to enter the Forced Modes you must wait for the beep and the display to go blank. You then have 8 seconds to press the Freeze button to activate the Forced Freeze Mode. Once you are in this mode, press the Freeze button to advance to the next function.
  - Depending on the model, there are from two to four Forced Modes. You must always wait for the beeping to start before advancing to the next mode, if you wait over 8 seconds to press the Freeze button, you will have to start over again. If you lose track of where you are in the Forced Modes, unplug the unit and start over.

Forced Operation and Test Mode

Test Mode

Press both buttons simultaneously for 8 seconds!

Display Code	Function
FF	Forced Compressor Run
RD	Forced Refrigerator Defrost
FD	Forced Freezer Defrost
--	Test Mode active



Press any button one more time
to cancellation Forced Mode

Cancellation

Forced Operation

Press any button One time
at the Test Mode

Forced Defrost for Fridge

Press any button One time
at the Forced Operation

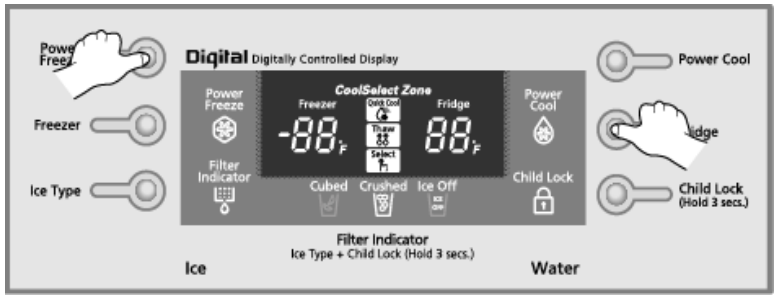
Forced Defrost for both compartment

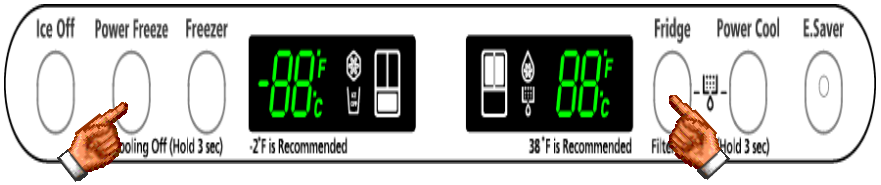
Press any button one more time
at the Forced Defrost for Fridge

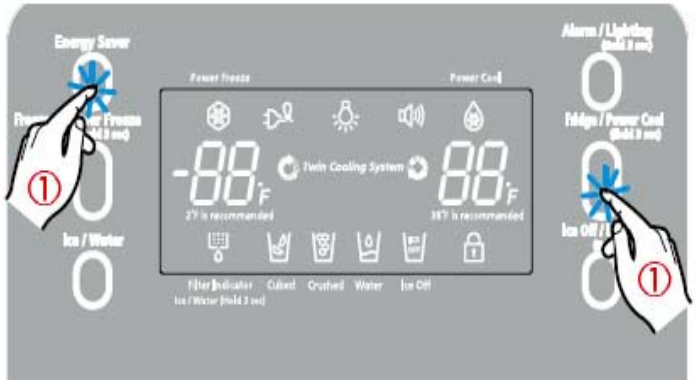
Forced Operation

For various refrigerator panels

Press both buttons simultaneously for 8 seconds!







Press Freezer button One time at the Test Mode to Force Compressor

Wait 5 seconds between button pushes

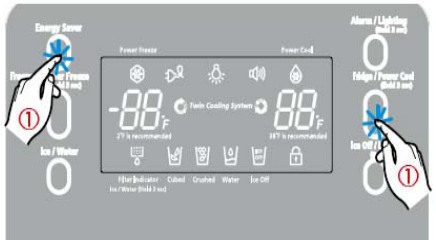
Press Freezer button Second time for Forced Defrost of Fridge

Press Freezer button a third time to Force Defrost for Fridge & Freezer

Cancellation, unplug unit

Forced Compressor → ***Forced Defrost for Fridge*** → ***Forced Defrost for both compartment***

RFG29* Series Inverter Compressor Forced Mode



For Test Mode

Press both buttons simultaneously for 8 seconds!

Press Freezer button One time at the Test Mode to Force each Compressor test

Forced Compressor High	***Forced Compressor Mid***	***Forced Compressor Low***
3600 RPM	2450 RPM	2050 RPM

Wait 5 seconds between button presses

Simultaneous manual defrost (fresh food and freezer compartments) function

Press Freezer button a 4th time to Force Defrost for ALL Compartments

Forced Defrost for ALL compartments

RM257*** Series Inverter Compressor Forced Mode

For Test Mode

Press both buttons simultaneously for 8 seconds!

Press Freezer button One time at the Test Mode to Force each Compressor test

Forced Compressor High	***Forced Compressor Low***	***Forced Compressor Mid***
~ 3600 RPM	~ 2450 RPM	~ 2050 RPM

Wait 5 seconds between button presses

Simultaneous manual defrost (all four compartments) function

Press Freezer button a 4th time to Force Defrost for ALL Compartments

Forced Defrost for ALL compartments

Forced Mode for Single Evaporator units

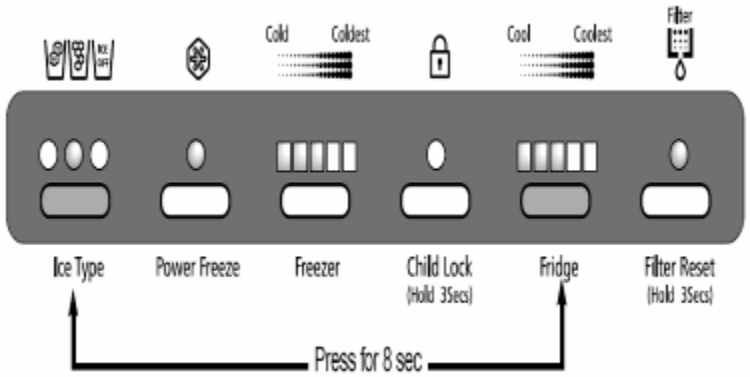
Use Freezer Key as a Test Key

Wait 5 seconds between button pushes

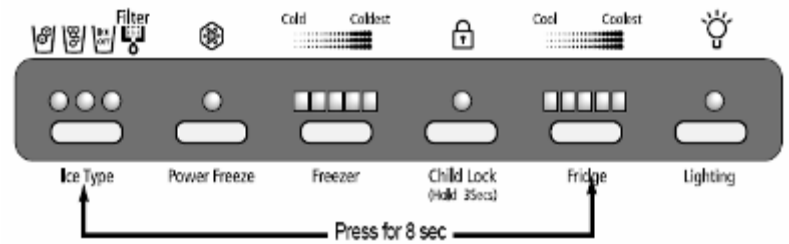
7-11) TEST (FORCED OPERATION / FORCED DEFROST)

- When pressing Refrigerator temp set KEY and ice selection KEY in PANEL PCB simultaneously for more than 8 sec. PANEL DISPLAY will go off and it moves onto TEST MODE. At this point, although Freezer/Refrigerator temp set KEY, quick freezing KEY, and ice selection KEY are pressed, it operates by TEST KEY.
- When pressing TEST KEY, Test function shall be changed in the order as Forced Operation ---> Forced Freezer Defrost---> Cancellation(normal operation)---> Forced Operation. If functions are canceled during the operation of TEST function, it is most desirable to turn off the power and turn it on again.

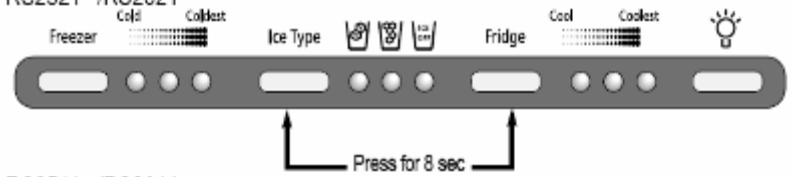
RS2630SW/XAA (for Best Buy)



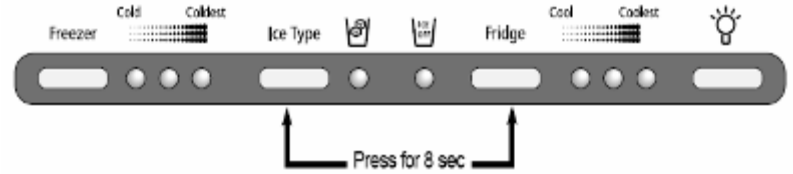
RS2531**/RS2631**



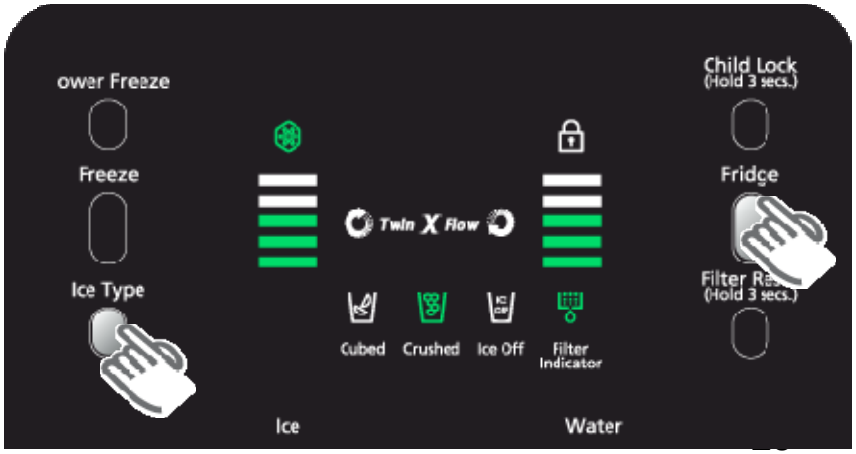
RS2521**/RS2621**



RS2511**/RS2611**



RS26/2530**

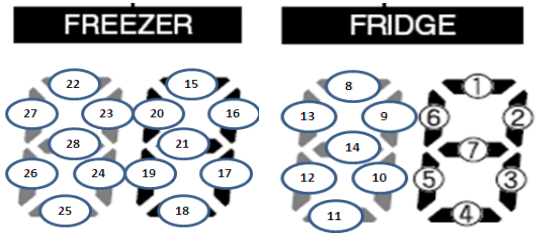


Refrigeration Troubleshooting

- The Diagnostic Mode is the most valuable troubleshooting tool you have for troubleshooting a refrigerator. When you are at the product this is the first test you should do.
- When a Samsung refrigerator is powered up if performs a Self Diagnosis, if an open or shorted sensor is detected it will lock the display and flash the code in the display. The refrigerator may have no operation, or operate in the emergency mode. Other faults detected will not lock the display or stop operation.
- To restart operation put into Manual Diagnostic Mode.
- Sensors that are off value, but not shorted or open, will not bring up a fault code.
- **Note: accessing this function resets ALL programming and error codes.**

Refrigeration Troubleshooting

- To enter the manual Diagnostic Mode you must press and hold two buttons, and hold them until the display stops blinking and beeps.
- Fault code display for all models that have temperature numbers in the display:
  - Each 8 is made up of 7 segments, each of those segments is a possible fault code.



- If there are no faults, the display will be blank or ha (8888) showing.
- On single evaporator units, no number display, lines or symbols will light up for faults.
- On all models the display will come back to normal in about 12 seconds

Refrigeration Troubleshooting

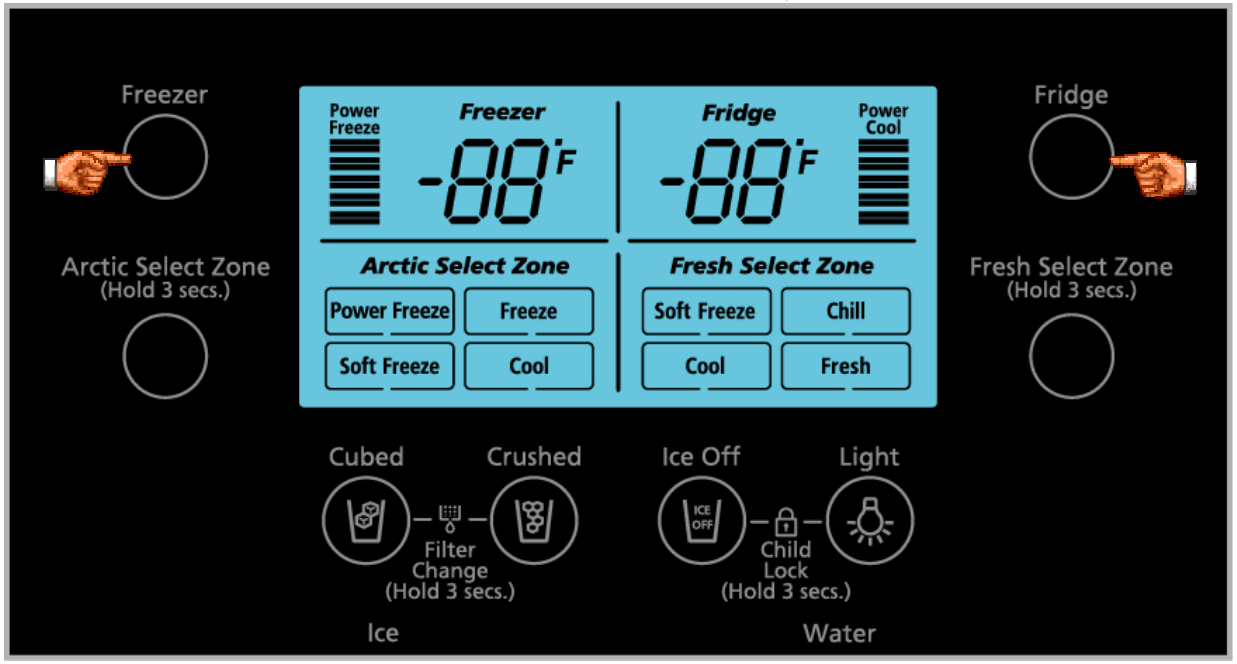
- A Sample fault code would be

is is an example of an Ice Maker Sensor failure.
- Things that can happen with this fault.
  - After a power failure the unit would be “dead”, lights work and blinking this code.
  - The Ice Maker is not making any ice
  - The Ice Maker is dumping partially frozen cubes

- If you see the fault below, ignore it. This is a modem communication error not applicable in the US.

Self Diagnostics

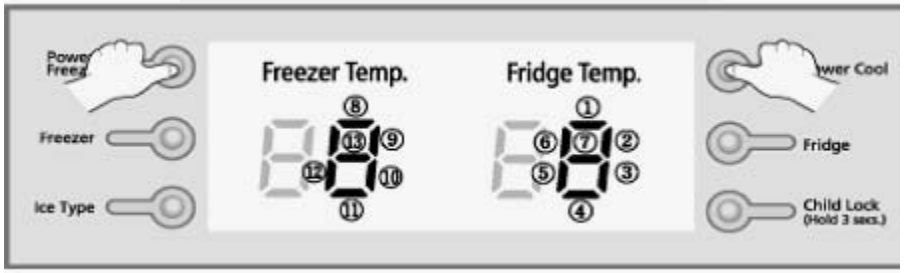
Press both buttons simultaneously for 8 seconds

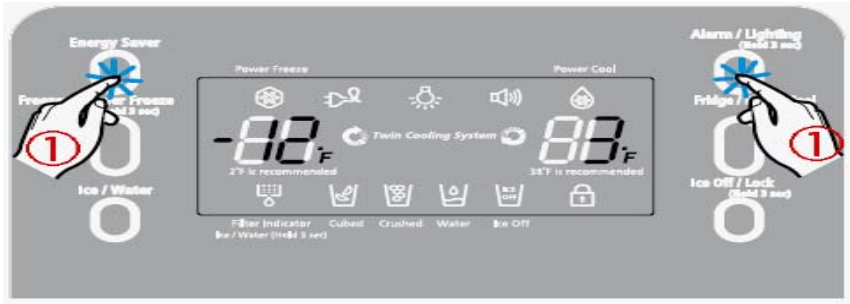


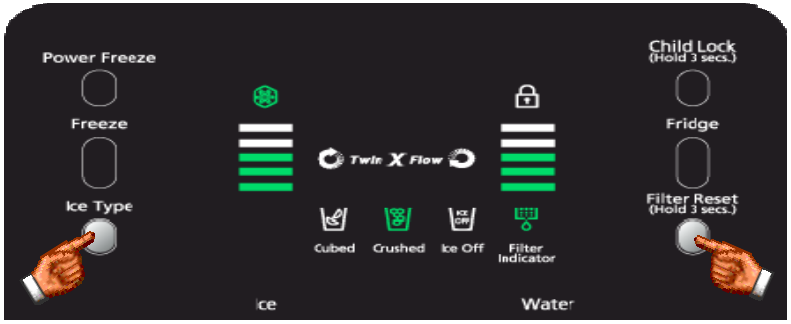
If a corresponding LED flickers, it means an abnormality of a sensor or component.

Self Diagnosis

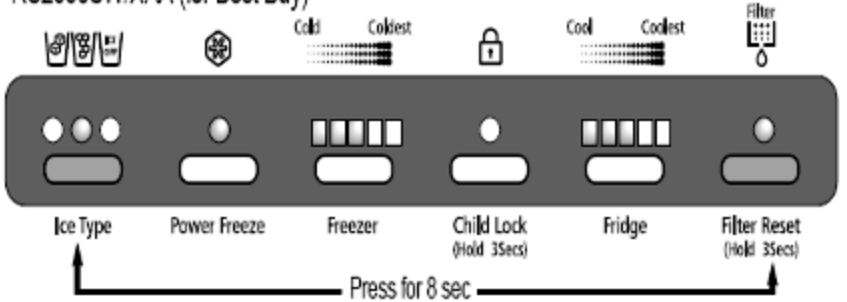
Hold Buttons until display stops blinking and beeps, then release and read fault codes. Various refrigerator panels shown



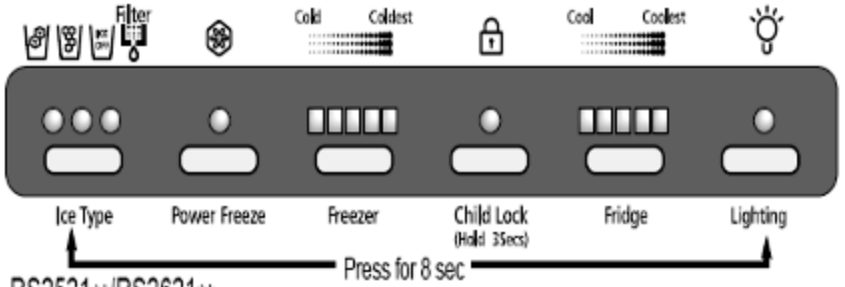




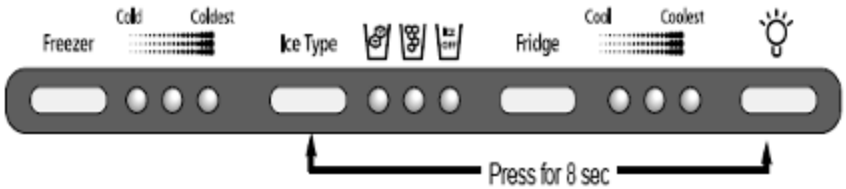
RS2630SW/XAA (for Best Buy)



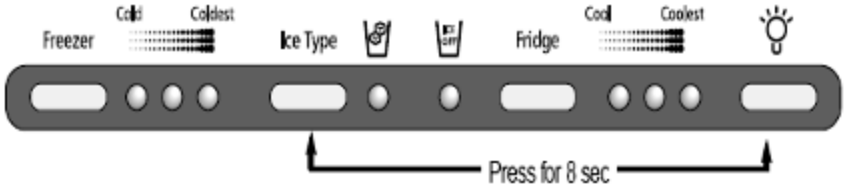
RS2531**/RS2631**

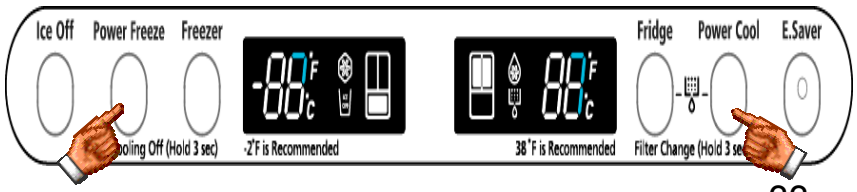


RS2521**/RS2621**



RS2511**/RS2611**





Error Code Display Pt 1

Codes are shown for example, a full list of codes for the specific product is available in the service manual

Error items for self-diagnostics

NO	Error items	LED	TROUBLE
1	I/M-SENSOR		Ice maker sensor measures open or shorted
2	R-SENSOR		Refrigerator sensor measures open or shorted
3	DEFROSTING SENSOR OF R COMPARTMENT		Refrigerator Defrost Sensor measures open or shorted
4	R-FAN ERROR		Refrigerator fan motor stuck or spinning to fast

Temperature Sensors are Negative Temp. coefficient measuring between 2.2 K and 100K ohms

Error Code Display Pt 2

Error items for self-diagnostics

Codes are shown for example, a full list of codes for the specific product is available in the service manual

NO	Error items	LED	TROUBLE
5	I/M FUNCTION ERROR		Ice maker did not return to level after an ice harvest, this is displayed after three attempts
7	R-DEFROSTING ERROR		Refrigerator Compartment defrosting heater- electric wire cut, short-circuit, contact failure, missing of sensor housing, or defective temperature fuse/bi-metal. The defect is also displayed if defrosting is not finished until after continuous heating over 80 minutes.
8	CR-SENSOR		CR Compartment Sensor Error- This can be an Electric wire cut, short-circuit, contact failure, or missing sensor. This can also be caused by a temperature reading > 122° or < -58 ° F.

Error Code Display Pt 3

Codes are shown for example, a full list of codes for the specific product is available in the service manual

Error items for self-diagnostics

NO	Error items	LED	TROUBLE
9	DEFROSTING SENSOR OF CR COMPARTMENT		CR compartment Defrost Sensor Error- This can be an Electric wire cut, short-circuit, contact failure, or missing sensor. This can also be caused by a temperature reading > 122° or < -58 ° F.
10	DEFROSTING SENSOR OF CF COMPARTMENT		CF compartment Defrost Sensor Error- This can be an Electric wire cut, short-circuit, contact failure, or missing sensor. This can also be caused by a temperature reading > 122° or < -58 ° F.
11	CR-DEFROSTING ERROR		CR Compartment defrosting heater- electric wire cut, short-circuit, contact failure, missing of sensor housing, or defective temperature fuse/bi-metal. The defect is also displayed if defrosting is not finished until after continuous heating over 80 minutes.
12	CF-DEFROSTING ERROR		CR Compartment defrosting heater- electric wire cut, short-circuit, contact failure, missing of sensor housing, or defective temperature fuse/bi-metal. The defect is also displayed if defrosting is not finished until after continuous heating over 80 minutes.

Error Code Display Pt 4

Codes are shown for example, a full list of codes for the specific product is available in the service manual

Error items for self-diagnostics

NO	Error items	LED	TROUBLE
13	WATER HEATER ERROR		Water Reservoir Heater measures open
14	EXT-SENSOR		Ambient Temperature Sensor reads open or shorted
15	F-SENSOR		Freezer Temperature Sensor reads open or shorted
16	F-DEF-SENSOR		Freezer compartment Defrost Sensor Error- This can be an Electric wire cut, short-circuit, contact failure, or missing sensor. This can also be caused by a temperature reading > 122° or < -58 ° F.

Error Code Display Pt 5

Error items for self-diagnostics

Codes are shown for example, a full list of codes for the specific product is available in the service manual

NO	Error items	LED	TROUBLE
17	F-FAN ERROR		Freezer fan motor stuck or spinning to fast
18	C-FAN ERROR		Compressor fan motor stuck or spinning to fast
19	CF-SENSOR		CF Compartment Temperature Sensor reads open or shorted
20	F-DEFROSTING ERROR		Freezer Compartment defrosting heater- electric wire cut, short-circuit, contact failure, missing of sensor housing, or defective temperature fuse/bi-metal. The defect is also displayed if defrosting is not finished until after continuous heating over 80 minutes.

Error Code Display Pt 6

Codes are shown for example, a full list of codes for the specific product is available in the service manual

Error items for self-diagnostics

NO	Error items	LED	TROUBLE
21	CF-FAN ERROR		CF Compartment fan motor stuck or spinning to fast
22	CR-FAN ERROR		CR Compartment fan motor stuck or spinning to fast
24	ICE PIPE HEATER ERROR		Ice Maker Fill line heater measures open

Error Code Display Pt 7

Codes are shown for example, a full list of codes for the specific product is available in the service manual

Error items for self-diagnostics

NO	Error items	LED	TROUBLE
25	Uart COMMUNICATION ERROR		This error is not applicable if you encounter this error during diagnostics ignore it
26	L↔M COMMUNICATION ERROR		Bad communication between LOAD↔MAIN MICOM
27	P↔M COMMUNICATION ERROR		Bad communication between LCD Panel ↔MAIN MICOM

2008 French Door Refrigerator Error Codes

Codes are shown for example, a full list of codes for the specific product is available in the service manual

NO	Error items	LED	TROUBLE
1	I/M-Sensor Error		Ice maker sensor measures open or shorted
2	R-Sensor Error		Refrigerator sensor measures open or shorted
3	R Defrost Sensor Error		Refrigerator Defrost Sensor measures open or shorted
4	R-Fan Error		Refrigerator fan motor stuck or spinning to fast
5	I/M Function Error		Ice maker sweep arm did not return to level after an ice harvest, this error is displayed after three attempts
6	R-Defrost Error		Refrigerator compartment defrost heater electric wire cut, shorted, contact failure, missing sensor housing or defective temperature fuse/bi-metal. The defect is also displayed if defrosting is not finished until after continuous heating over 80 minutes.
7	Pantry Damper Heater Error		Damper Heater Error – Possible open wire
8	Pantry Sensor Error		Pantry room Temperature sensor measuring open or short
9	Water Tank Heater Error		Water Tank Heater Error – Possible open wire
10	EXT-Sensor		Ambient Temperature Sensor reads open or shorted

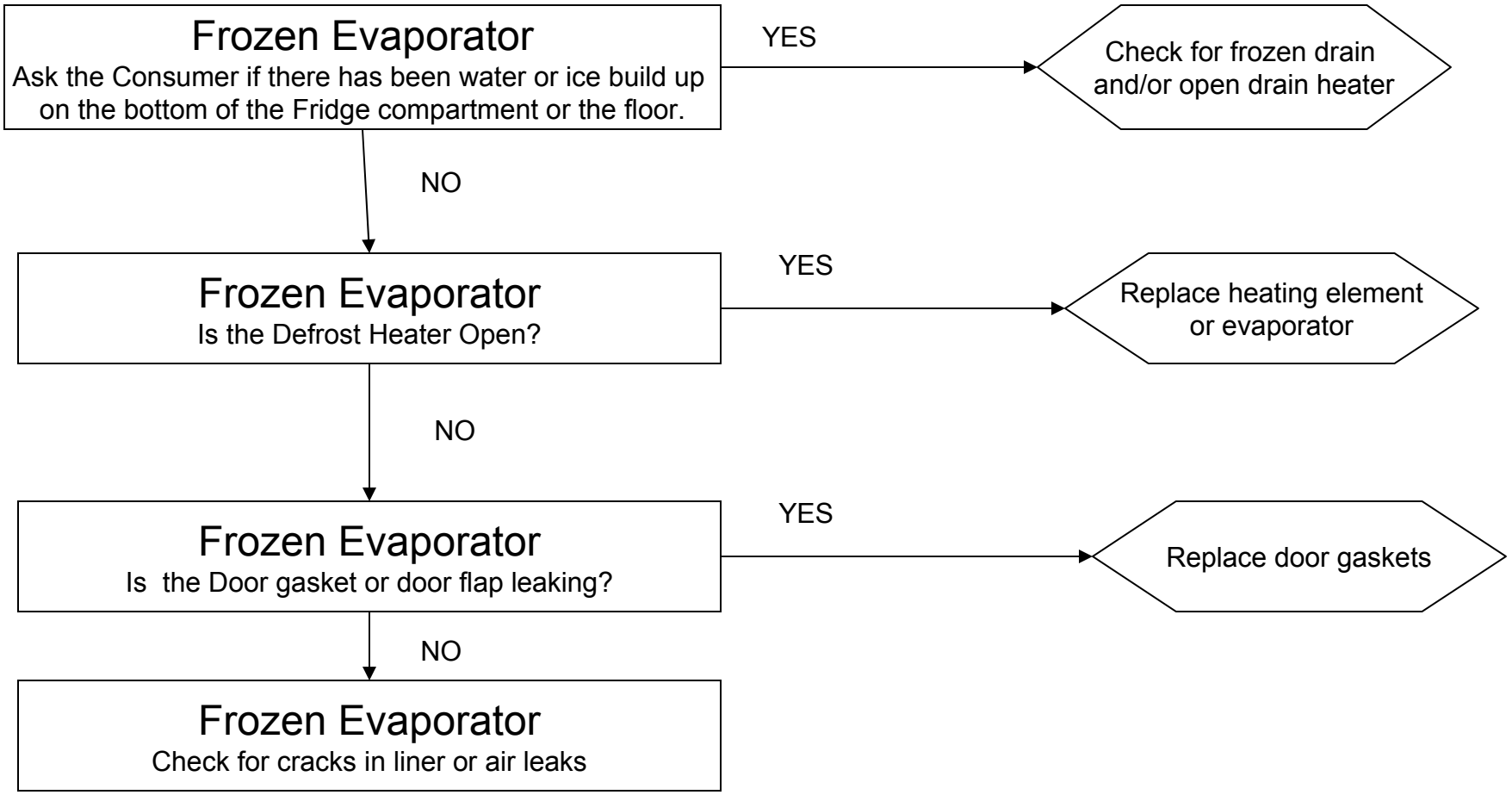
2008 French Door Refrigerator Error Codes

Codes are shown for example, a full list of codes for the specific product is available in the service manual

NO	Error items	LED	TROUBLE
11	F-Sensor		Freezer Temperature Sensor reads open or shorted
12	F-Defrost Sensor Error		Freezer compartment Defrost Sensor Error - Cut wire, shorted, contact failure, or missing sensor. This can also be caused by a temperature reading > 122° or < -58 ° F.
13	F-Fan Error		Freezer fan motor stuck or spinning to fast
14	C-Fan Error		Compressor fan motor stuck or spinning to fast
15	Ice Room Sensor Error		Ice Room Temperature reads open or short
16	F-Defrost Heater Error		Freezer compartment defrost heater electric wire cut, shorted, contact failure, missing sensor housing, or defective temperature fuse/bi-metal. The defect is also displayed if defrost is not finished after continuous heating over 80 minutes.
17	Ice Room Fan Error		CR Compartment fan motor stuck or spinning to fast
18	L ↔ M Comm Error		Bad communication between LOAD ↔ MAIN MICOM
19	P ↔ M Comm Error		Bad communication between LCD Panel ↔ MAIN MICOM

Defrosting Troubleshooting

Check for any fault codes in the manual Diagnostic Mode


Frozen Evaporator
Ask the Consumer if there has been water or ice build up on the bottom of the Fridge compartment or the floor.
YES
Check for frozen drain and/or open drain heater
NO
Frozen Evaporator
Is the Defrost Heater Open?
YES
Replace heating element or evaporator
NO
Frozen Evaporator
Is the Door gasket or door flap leaking?
YES
Replace door gaskets
NO
Frozen Evaporator
Check for cracks in liner or air leaks

Testing Defrost Circuits

Access the main PCB for voltage/resistance testing

- With the compressor running test the sensors
- Enter Forced Mode Defrost
- Measure the heater voltage
- Remove the power and heater connector and check the heater circuit resistance

- Defrost Sensor
  - The sensor shuts off heater At 50°F in Freezer, 63°F in Fridge
  - If the sensor is bad it may shut off the defrost circuit in a few minutes or not start, causing ice build-up, or it could lock up in defrost mode and become a total no cool.

Note: A defective sensor may check OK at room temperature, test at operating temperature only.

Defrosting Troubleshooting Part 1

- **Defrost Sensors**
  - **Testing**: Check the DC voltage across both evaporator defrost sensors, with the compressor running. They should read less than a tenth of a volt difference, as they are both on the same refrigerant line. They usually read ~ 3.7VDC, after the compressor has been running for about 10 minutes. You may find one reading about 30 to 50 degrees off (lower VDC - higher temp), if so replace it.
- **Alternate Sensor Testing**

  Make ice slurry. To do this, fill a cup with ice (preferably crushed), then add water and a teaspoon of salt to make a slush. Mix thoroughly and allow to sit for 2 to 3 minutes. This will give you a 32°F reference. Lower the sensor into the mixture and leave for about 1 minute, check the resistance. It should be very close to 13,300 Ω. Before reinstalling the sensor, be sure to rinse it with fresh water and dry it.

Defrosting Troubleshooting Part 2

Enter the Forced Mode per instructions

- Check heater circuit amperage at the Main PCB or A/C line; look for ~1.2 amps for the Fridge and ~2.2 amps for the freezer or 3.4 amps total.

  NOTE: If compartment is warm, you only have about 90 seconds to test.

- **Freezer** - Check service manual for connector and wire color code for the model being serviced.
- **Fridge** - Check service manual for connector and wire color code for the model being serviced.
- **Low Current draw?** Check individual defrost circuits, if one is low check for open defrost heater
- **No Current draw?** Check voltages and resistances next.

Defrosting Troubleshooting Part 3

Enter the Forced Mode per instructions

- Check the heater circuit voltage at the Main PCB; should be 120VAC for Freezer and Fridge.

  NOTE: If compartment is warm, you only have about 90 seconds to test.

Listen for the relay closing then check the heaters.

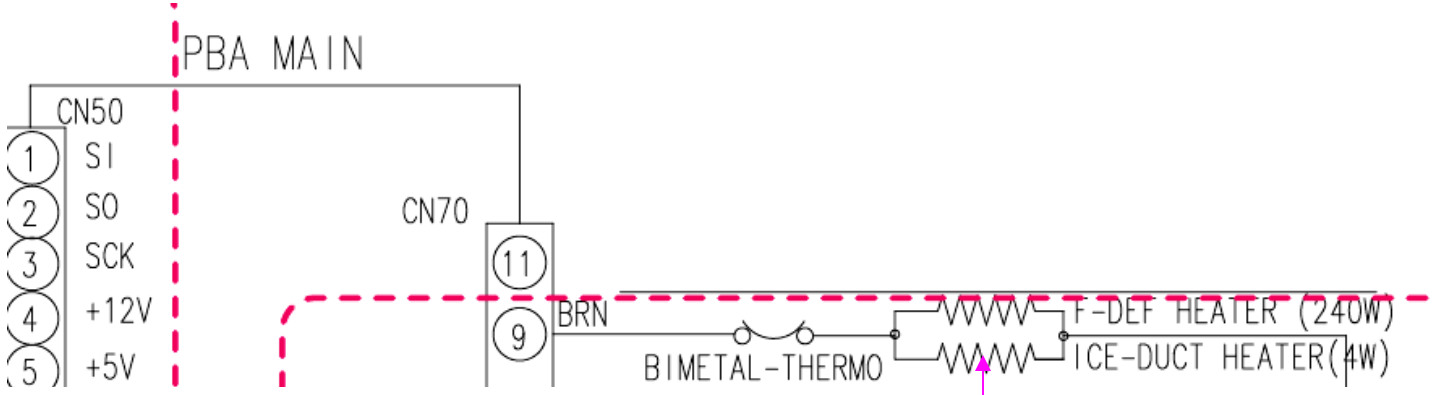
- **Freezer Defrost Heater -** Check service manual for connector and wire color code for the model being serviced.
- **Fridge Defrost Heater -** Check service manual for connector and wire color code for the model being serviced.
- **No AC Voltage?** Change Main PCB

Defrosting Troubleshooting Part 4

Heater circuit resistance - Unplug the refrigerator. Remove the defrost heater connector from PCB.

- **Freezer** - Check heater circuit resistance at the Main PCB, look for 35–50 Ω average.
- **Fridge** – Check heater circuit resistance at the Main PCB, look for 60-95 Ω average.
- **Freezer & Fridge** - If resistance is around 2600 Ω, Thermo-Fuse (Bi-metal) is good, Defrost heater is open.
- **Open Circuit** - Check the Thermal Fuse (Bi-metal), Heater and Connectors

Defrosting Troubleshooting



Example of a
2600 Ω heater

Defrost Error Symptoms

<u>NOTE:</u> Evaporator covers may break if removed while frozen as they are plastic, replace if damaged.

- Ice build up in either the freezer or refrigerator compartment can be caused by a blocked drain. It is possible that the drain is not being defrosted by the heaters enough to properly clear the drain and pass the melted water into the catch pan.
- Noise from the refrigerator/freezer fan or weak cooling. Noise disappears when the customer opens door. The defrost sensor, heater, thermal fuse/bimetal device are OK but ice is built up in the drain area of evaporator cover.

Defrosting Error Causes

- The heat from the defrost heater does not transfer to the evaporator drain
- The Styrofoam around the evaporator cover absorbs moisture and frost begins to form on the evaporator, defective evaporator cover.
- During the defrost cycle, the frost melts and drips down to the drain where it becomes frozen again.
- Ice blockage in the drain grows larger with every defrost cycle.
- Because of the growing ice block, cooling efficiency diminishes at a growing rate and eventually blocks the fan blades.
- Self diagnostics will eventually show a fan error.

Defrost Circuit Modification

Cause

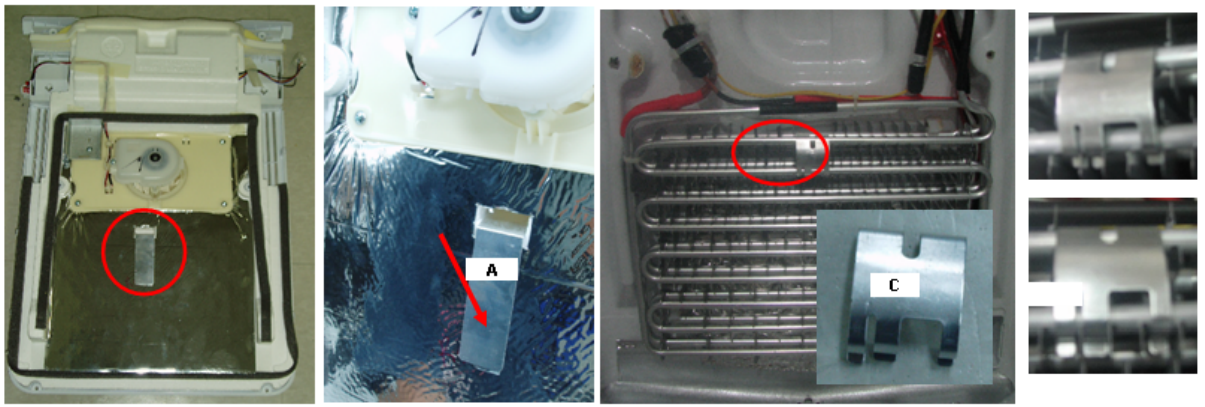
1. The heat of defrost heater does not transfer to the drain hole of ASSY COVER EVAP REF
2 Styrofoam around fan absorbs moisture and frost grows.
3. During defrost, the frost melts and it get to be frozen again after defrost completed.
4. Ice gets bigger and bigger. Finally, the ice interferes with Fan.
5. Weak cooling appears.
6. With Self diagnosis mode, Fan motor error is shown.

Solution

- **Aluminum clips for better heat-transfer are applied**

  Clip A faces with C which's assembled on the heater line of Evaporator. So heat of defrost heater transfers directly to drain hole.

- **This improvement is to be applied from March 2007 production.**



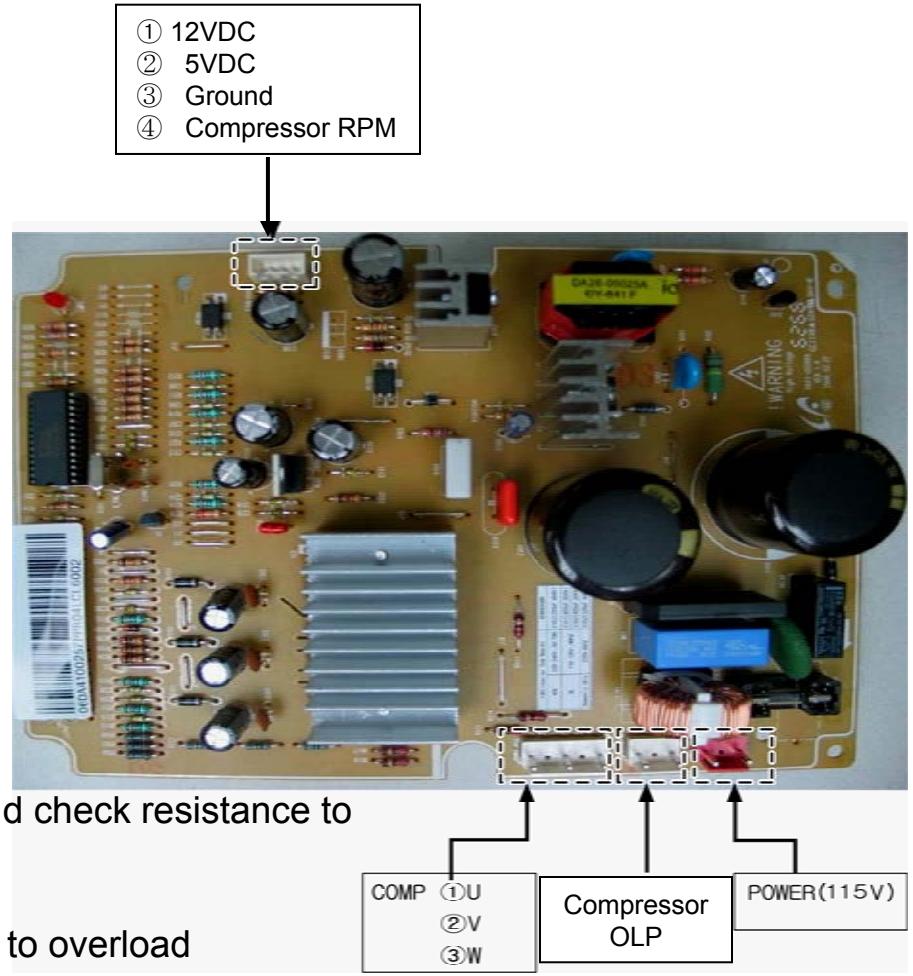
- Metal clips “A” and “C” can be placed on both the evaporator cover and the evaporator. The metal clips will touch and transfer heat more efficiently from the defrost heaters to the drain preventing ice build up.

Part numbers for these parts are as follows:

A: DA61-03502A PLATE-DRAIN INS EVAP, REF

C: DA61-03585A FIXER-EVAP REF

Compressor Controller board connector arrangement and detail explanation (RM257AB*)



Forced Modes:

FF1 - Compressor high speed - 2.7 amps
FF2 - Compressor low speed - 1.6 amps
FF3 - Compressor medium speed - 2.0 amps
FD - All defrost elements on - ~ 4.0 amps

NOTE: FF2 & FF3 could be reversed.

Compressor not running

Check for 5 minute delay
-- Not in delay
Force Operation
-- If no operation, disconnect CN03 (SMPS PCB) and check resistance to the windings. ~10 Ω
Comp windings OK
-- Disconnect CN02 (SMPS PCB), check resistance to overload
Overload OK
-- Replace Main PCB and Inverter PCB

Model: RFG294 **, RFG295**, RFG299**
Compressor Troubleshooting

Compressor not running
Check for 5 minute delay -- Not in delay
Force Operation
If no operation, disconnect CN03 (SMPS PCB) and check resistance to the windings. ~ 10 Ω
Comp windings OK
Disconnect CN02 (SMPS PCB), check resistance to overload
Overload OK
Replace Main PCB and SMPS PCB

Forced Modes:
FF1 - Compressor high speed - 2.7 amps
FF2 - Compressor medium speed - 2.0 amps
FF3 - Compressor low speed - 1.6 amps
FD - All defrost elements on - ~ 3.4 amps

Chapter 4

Common Refrigerator Service Issues

No Ice - Flex Tray I/M

- For the ice maker to operate properly, water pressure between 20 and 125 PSI is required. A quick test of water pressure would be filling a 6 oz paper cup in less than 10 seconds. If the internal water filter is clogged, the water pressure to the icemaker will be reduced. The foreign matter at the water supply valve near the icemaker can also reduce the water pressure. Additionally, low water pressure at the fill tube can be caused by a defective fill tube heater.
- If the tray seems to be filling completely but the unit never harvests, verify the operation of the Icemaker sensor in the tray. Normally the unit harvests when the sensor reads approximately 1.5 degrees Fahrenheit for 5 minutes. The sensor should read about 3.7 volts at the main board connector when the cube temperature is 1.5 degrees. After the fill, the sensor will read water temp, 1.5 to 2.2 volts. Remember, using frame ground might produce inaccurate values; instead use the DC ground on the PC board. If this value is incorrect the sensor is suspected to be defective.
- You can also verify the operation of the harvest motor by pressing the black test unit on the motor housing near the back of the assembly.
- Is the freezer not dropping below 10 degrees?
- Make sure the Freezer defrost circuit is working properly and the evaporator and condenser fans are working correctly. Inspect condenser coil for air blockage.

Slow Ice - Flex Tray I/M

- This problem is usually caused by a defective sensor or low water pressure. The I/M sensor will delay the time by adding extra fills if the water pressure is low. Also check the operation of the freezer, if the freezer temperature is above 1.5 degrees, ice production will be delayed. This can also be caused by a problem with the freezer air vent, make sure the air duct near the ice maker is not restricted. If the unit is on an R/O water system, water pressure may be to low for consistent ice production.
- Is there any frost in the freezer compartment?
- Excessive frost could mean warm air leaking into the compartment warming the top of the freezer preventing the ice maker sensor from maintaining the necessary 1.5 degrees to harvest.
  - Check for ice chute failure, a leak at ice maker fill tube, an air leak around defrost water drain by evaporator coil, cracks in liner or a bad door seal.
- Finally make sure the most updated version of Ice maker kit has been installed. The ice maker designs in many models have been updated for better performance. Check GSPN for any related service bulletins regarding Ice-maker changes.

Shattered Ice Cubes - Flex Tray I/M

- When all ice shatters it's because of a bad tray or harvesting at a temp that is too cold (lower than 1.5 degrees), in some areas hard water issues that can also cause shattered cubes. The temp in the freezer should not have any effect on this issue, as long as it’s below 1.5 degrees, as a properly installed sensor will not read the freezer temp, only the water/ice temp.
- Check the Ice tray for defects in the plastic. Impurities or hard water can cause the plastic to become rough and inhibit the ice falling from the tray during the twisting. If this is the case, replace the tray assembly.
- It is possible to get ice too cold. Ice that is too cold will shatter during harvest. This can be from the (1) sensor not reading the correct temp (2) the sensor not mounted correctly (3) by programming the icemaker offset value to a lower number (4) the board not understanding the reading.
- To check the sensor you must check the tray temp (not air temp) and compare it to the sensor reading. The sensor should read about 3.7 volts at the main board connector when the cube temperature is 5 degrees. After the fill the sensor will read water temp 1.5 to 2.2 volts.
- To clear offsets, put unit into Diagnostics mode.
- Please note, some shattering is normal for a flex tray icemaker, especially if the Ice Off feature was used recently.

Service Concerns- Heat Release I/M

- Troubleshooting Observations
- Is there any frost in the freezer compartment?
- Excessive frost on the evaporator coil will either coat the coil enough to warm the air to 32 degrees to supply the ice room or block the air duct completely to the ice room. Make sure the Freezer defrost circuit is working properly and the freezer and ice room compartments are sealed properly
- The consumer complaint could be “it only makes ice once or twice a day” The Ice maker will harvest within a few hours of the freezer defrost cycle, when the evaporator is frost free. As the frost builds up on the evaporator again the ice maker will stop as the temperature is too warm. Ice making will stop until the next defrost cycle completes which will be 12 to 23 hours later. This is a defrost error not an icemaker error. Check the freezer door seal, ice room door seal and the freezer defrost heater.

Service Concerns – Heat Release I/M

- Is the Ice Bucket locked firmly in position?
- Try to move the bucket, when locked in place, any movement would mean that one of the locks is not latched. This will cause warm fridge air to enter the ice room and stop ice production.
- Temperature checks (Actual)
- The Back of Ice Room should measure 0 to 6 °F when making ice
- The Back of Freezer compartment should measure -4 to +3 °F

Heat Release Ice maker - Troubleshooting

- Voltage tests
- The Ice Room Sensor voltage should match the actual ice room temperature; refer to the sensor voltage/ temperature chart in the service manual.
- The Freezer Sensor voltage should match freezer temp and also be close to the actual ice room temperature, refer to the sensor voltage/ temperature chart in the service manual. If the bucket is full the Ice Room temperature should be around 24 °F.

Heat Release Ice Maker - Troubleshooting

- The Freezer Defrost Sensor Voltage should be 0 to -17 °F, with the compressor running, to show no frost/ice buildup and good operating system, refer to the sensor voltage/temperature chart in the service manual.
- The Ejecting Thermistor should not measure below 17 °F, unless the bucket is full, as it should harvest at 18 °F. If Ejecting Thermistor measures actual ice room temperature, and the bucket is not full, it would mean that the I/M is not harvesting. If there has been a recent harvest, the thermistor might measure up to 50 °F as the mold heater and fresh water has warmed the sensor.

Heat Release Ice Maker - Troubleshooting

- If any of the sensors measure incorrectly replace the defective sensor
- The Ice Room Fan should read around 7 to 9 VDC when it is running. Be sure to defeat the door open switch when testing the fans. You can force the fan to turn on by putting unit in Forced Freeze mode.
- If the I/M Thermistor reads below 18 ℉ after 38 minutes and there is no harvest replace the main PCB

RF267**, RF26VAB** Not all Connectors and pins used on all models

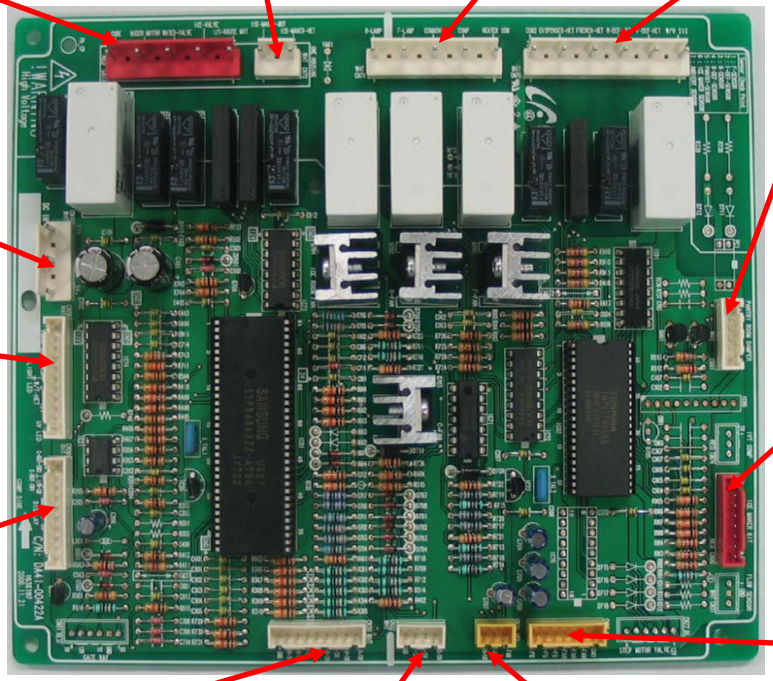
CN73 A/C Load
1-(CN70-1) Cube Solenoid (Yel-Red) RF267
3-(CN70-1) Auger Motor (Pnk-Red) RF267
5-(CN70-1) Dispenser Valve (W/Blk-Red) RF267,266
7-(CN70-1) Ice Maker Valve (Prp-Red)
9-(CN70-1) Ice Cover Route (Brn-Red) RF267

CN71
1-(CN70-1) R Lamps (Blu-Red)
3-(CN70-1) F Lamp (Prp-Red)
5 Common N (Gry)
7-(CN70-1) Comp (S/Blu-Red)
9 Heater Common (Org)

CN70
1 Common Line L (Red)
3-(CN71-5) Disp Heater (Blk-Gry) (RF267)
5-(CN71-5) French Heater (Yel-Gry)
7-(CN71-9) R Defrost (Wht-Org)
9-(CN71-9) F Defrost (Brn-Org)

CN72 (RF267 only)
1-(CN70-1)Ice Maker Motor (Brn)
3-(CN70-1)Ice Maker Heater (Wht)

CN91 Pantry Room Damper
1-2 Damper Heater 12VDC (Blk-Brn)
3-4 Damper Motor (Wht-Blu)
5-6 Damper Motor (Yel-Red)



CN10 Low Volt Pwr
1-3 5VDC (Red-Blk)
5-3 12 VDC (Yel-Blk)

CN78
4-5 Water Tank Htr (Brn-Blk) RF267
6,7,8 Pantry Disp
9-11 +12vdc (Blu-Wht)
10-11 +5vdc Sw input (Prp-Wht)

CN90 Ice Maker (RF267 only)
4-8 Eject Sensor (Wht-S/Blu)
5-8 Test Sw 5VDC (Gry-S/Blu)
6 Full Sw (Blu)
7 Horiz Sw (Prp)
8 Ground (S/Blu)

CN50 Display
4-6 +12 VDC (Org-Pnk)
5-6 +5 VDC (Yel-Pnk)
8-(CN75-1) Water Sw (Blu-Red) RF266

CN75 F, R, C Fans
2-1 F Fan (Yel-Gry)
3-1 R Fan (Org-Gry)
4-1 C Fan (S/Blu-Gry)
5 F Fan FG (Blk)
6 R Fan FG(Brn)
7 C Fan FG(Red)

CN30 Sensors & Switches
1-5 Freezer Dr Sw (Blk-Gry)
2-(CN50-7) R Door Sw (Prp-Gry)
3- (CN75-1) F Sensor (Red-Gry)
4-(CN75-1) F Def Sensor (Org-Gry)
6-(CN75-1) R Sensor (Wht-Gry)
7-(CN75-1) R Def Sensor (S/Blu-Gry)
8-9 Pantry Sensor (W/Blk- Gry)

CN32 Sensor
1-4 Ambient Sensor (Wht-Wht)
2-(CN75-1) 5VDC to I/M (Red-Gry) RF267
3-(CN75-1) Ice Room Sensor (Org-Gry) RF267

CN76 Ice Room (RF267 only)
1-(CN75-1) Ice Room Fan (Blk-Gry)
2 Ice Fan FG (Brn)
3-(CN75-1) Ice Bucket Sw (Red-Gry)

Model : RFG 294 **, RFG295**, RFG299** Not all Connectors and pins used on all models

CN74 A/C Load
1-(CN70-9) Cube Solenoid (Yel-Red)
3-(CN70-9) Auger Motor (Pnk-Red)
5-(CN70-9) Dispenser Valve (W/Blk-Red)
7-(CN70-9) Ice Maker Valve (Prp-Red)
9-(CN70-9) Ice Cover Route (Blu-Red)

CN71
1-(CN70-9) R Lamps (Blu-Red)
3-(CN70-9) F Lamp (Prp-Red)
9 Heater Common (Org)

CN70
1-11 Disp Heater (Blk-Gry)
3-11 French Heater (Yel-Gry)
5- (CN71-9) R Defrost (Wht-Org)
7- (CN71-9) F Defrost (Brn-Org)
9- L1 (Red)
10- N (Gry)

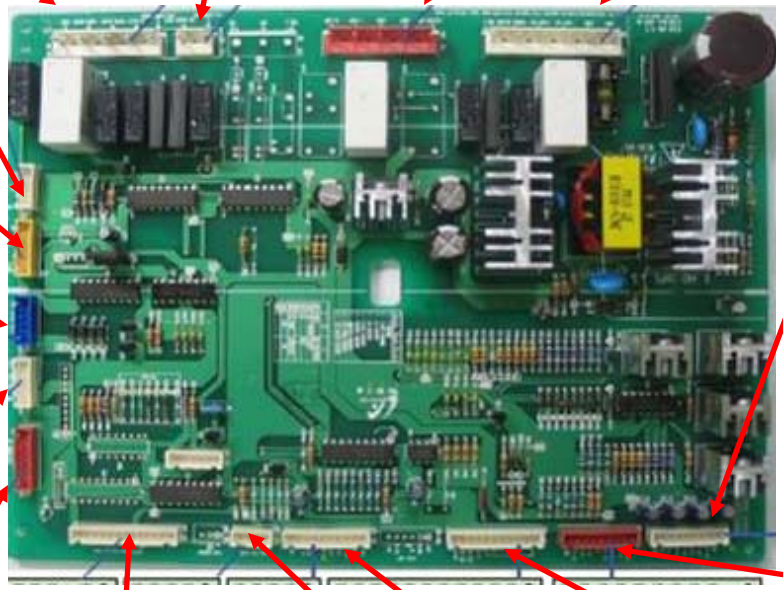
CN73
1-(CN70-9) I/M Heater (Brn-Red)
3-(CN70-9) I/M Motor (Wht-Red)

CN31 Sensor
1-4 Ambient Sensor (Wht-Wht)
2-(CN90-8) 5VDC to I/M (Red-S/Blu)
3-(CN76-1) Ice Room Sensor (Org-Gry)

CN78 Lamp/Veg LED
4-7 +13vdc (Red-Gry)

CN77 Stepper Motor
1 +13 vdc (Red)

CN91 Pantry Room Damper
1-2 Damper Heater 12VDC (Blk-Brn)
3-4 Damper Motor (Wht-Blu)
5-6 Damper Motor (Yel-Red)



CN76 F, R, C Fans
2-1 Ice Room Fan (Blk-Gry)
3-1 F Fan (Yel-Gry)
4-1 R Fan (Org-Gry)
5 C Fan (S/Blu-Gry)
6 Ice Room Fan FG(Pnk)
7 F Fan FG(Brn)
8 R Fan FG(Red)
9 C Fan FG(Blu)

CN30 Sensors & Switches
1-5 Freezer Dr Sw (Blk-Gry)
2-(CN50-7) R Door Sw (Prp-Gry)
3- (CN76-1) F Sensor (Red-Gry)
4-(CN76-1) F Def Sensor (Org-Gry)
6-(CN76-1) R Sensor (Wht-Gry)
8-(CN76-1) R Def Sensor (S/Blu-Gry)
9- (CN76-1) Pantry Sensor (W/Blk-Gry)

CN90 Ice Maker
4-8 Eject Sensor (Wht-S/Blu)
5-8 Test Sw 5VDC (Gry-S/Blu)
6 Full Sw (Blu)
7 Horiz Sw (Prp)
8 Ground (S/Blu)

CN51 Pantry Room
7-5 +13vdc (Blu-Wht)

CN50 Display
4-6 +13 VDC (Org-Pnk)
5-6 +5 VDC (Yel-Pnk)
8-6 Ice/Water Sw (Blu-Pnk)
9-6 Ice Rte Sw 1(Prp-Gry)
10-6 Ice Rte Sw 2 (Wht-Gry)

CN75
To Comp Inverter Board

CN79
1-2 Photosynthesis Module (Blk-Brn)
10-6 Water Tank Htr (Wht-Pnk)

Common Defrost Problems

Evaporator frozen, solid ice

- Fridge
  - Bad evaporator cover, open drain heater, add Fixer and Plate, or blocked drain.
- Freezer
  - Open drain heater, bad evaporator cover, add fixer and plate, or blocked drain

Evaporator frozen, all frost

- Fridge or Freezer
  - Bad defrost sensor, open thermal fuse, bad main PCB, open defrost heater
- Ice Chute Flapper not Sealing properly

Defrost Service

Single Evaporator Models

- Frost/Ice forming on the evaporator cover and blocking fan and air tunnel to fridge.
  - Install Repair Kit for Serial Number range: up to **42BL3***** Units manufactured before April of 2006 For model RS2630
  - Check for ice chute failure, leak at ice maker fill tube, air leak around defrost water drain by evaporator coil, cracks in liner, or door seal on fridge or freezer.
  - Excessive door openings, doors left open for long periods, hot foods put in fridge

Evaporator frozen, solid ice

- Blocked drain

Evaporator frozen, all frost

- Bad defrost sensor, open thermal fuse, bad main PCB, open defrost heater

No Cool Service Issues

Both Compartments

- Unit locked in defrost mode
- Compressor relay failure on main PCB
- Failure of both defrost circuits
- No sealed system charge

Fridge

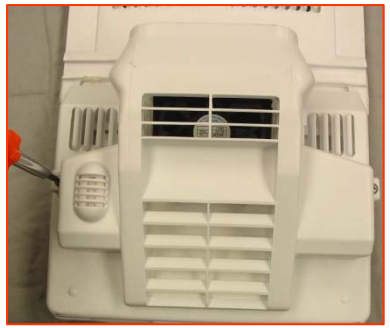
- Failure of defrost circuit
- Evaporator fan failure
- Door switch failure

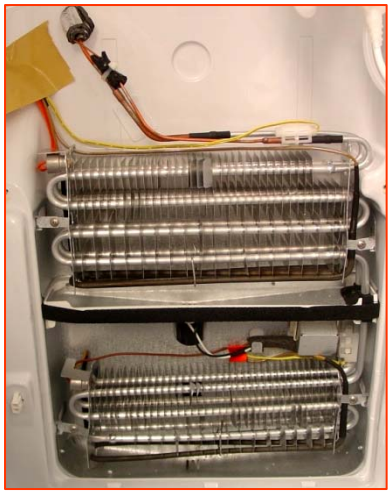
Freezer

- Failure of defrost circuit
- Evaporator fan failure
- Door switch failure
- Low sealed system charge

Service Access

- Disassembly of Quattro Cool Evaporator Covers, both access the same way





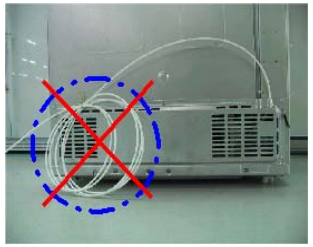
Chapter 5

Refrigerator Installation

For additional installation details see the accompanying 2008 Installation DVD

Water Connection

1	Connect Water Pipe Hose	- Insert the plastic water pipe hose to the existing water source and fix it with compression hardware. If there is no existing icemaker water line consult a licensed plumber. - Check if there is any water leakage at the connection areas and if the hose is being kinked. When there is water leaking, try connecting again.	
2	Secure the Water Pipe Tube	- With a C/F clip, fix the water pipe hose to the refrigerator wall. Make sure that the water pipe hose is not kinked or damaged when dressing the excess water pipe.	

Dress the Water Pipe Tube	Example of Bad Installation	Coiled hose, no backup tube, water hose touching the floor.	
	Example of Good Installation	No coiled hose, backup tube added, water hose does not touch on the floor.	

Refrigerator Filter Housing Damage

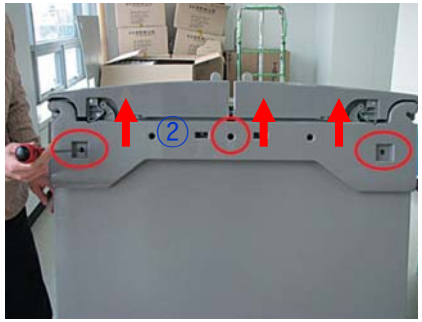
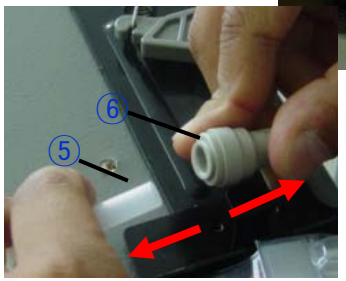
Always use the original Samsung filter when replacement is required at the six month interval. When aftermarket filters are used, there is the possibility that the filter will leak causing the water to freeze if the refrigerator temperature is set too low. When the water freezes there is the possibility that the filter housing will crack and start flowing water into the refrigerator compartment. When this happens the housing must be replaced.

Coat the “O” rings here here

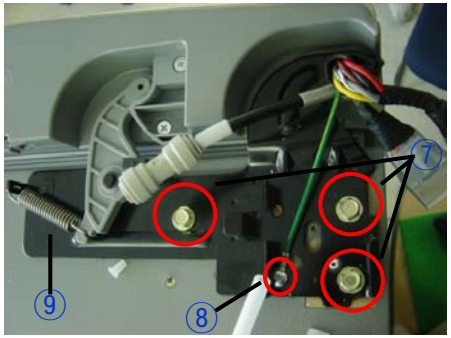
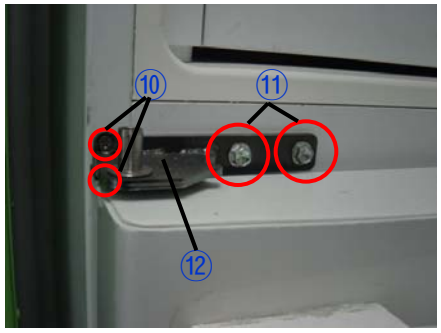
Housing may crack and leak

In order to put the filter in smoothly and to be able to remove it without forcing it, try coating the “O” rings with medical grade silicone.
Note: Replacement refrigerator water filters will no longer be considered a service item and will exclusively be handled by Samsung sales and marketing groups.

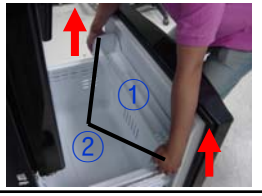
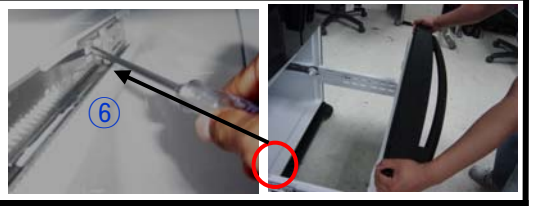
Door Removal – French Door Model

Refrigerator Door	1. With the door opened, remove the Top Table cap ① with a Flat head screwdriver, and close the door. Remove the 3 screws holding down the Top Table and remove the Top Table ②.	
	2. Disconnect the electrical connector ③ above the upper right door hinge and the 3 electrical connectors ④ above the upper left door hinge. Disconnect the water tube ⑤ by pulling the tube fitting ⑥ apart as shown in the picture.	

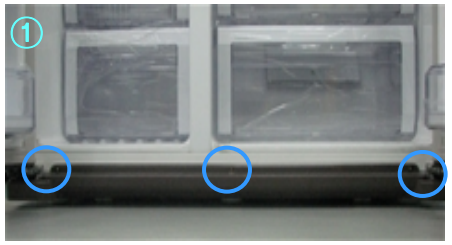
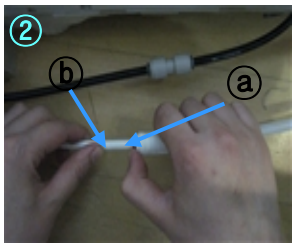
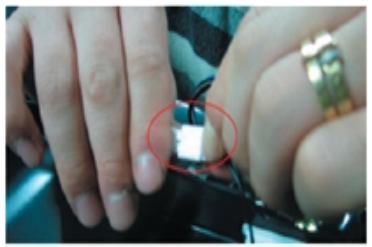
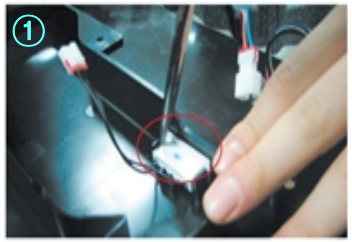
Door Removal – French Door Model

Refrigerator Door	3. Remove the 3 hex head bolts ⑦ found attached to the upper left and right door hinges with a Wrench (10mm). With a Philips head screwdriver, remove the ground screw ⑧ found attached to the upper left and right door hinges. Remove the upper left and right door hinges ⑨.	
	4. Lift the door straight up to remove.	
	5. With a Philips head screwdriver, remove the 2 screws ⑩ attached to the lower left and right door hinges. With a Wrench (10mm), remove the 2 hex head bolts ⑪ attached to the lower left and right door hinges. Remove the lower left and right door hinge ⑫.	

Door Removal – French Door Model

Freezer Door	1. Pull the drawer open to full extension	
	2. Remove the tilting pocket ① by pulling the both brackets ② upward at the same time.	
	3. Take out the lower basket ③ by lifting the basket up from rail system	
	4. Remove a fixing pin ④ and remove a shaft ⑤ by pushing it to the right side with your hand.	
	5. Separate the rail from the rail cover by pushing the hooks ⑥ in on both sides of the rail. After pushing the hooks in, remove the drawer by pulling towards you with both hands.	

Door Removal – Side by Side Model

 	① Take off the Leg-Cover by Removing the 3 screws. ② Separate the Water Line by pressing the coupler ⓐ and pulling the water tube ⓑ away.
	① With the Door closed, remove the screw on the Upper Hinge Cover. ② Disconnect the wires by gently pulling the connectors apart.
	① If necessary, remove the Reed S/W using a flat blade screwdriver. ② Remove the Earth screw and the 3 bolts as shown.
	① Remove the Upper Hinge and remove the wiring harness from the hinge slot. ② Remove the door from the lower hinge by lifting up the door straight.

Door Removal – Bottom Mount Model

Refrigerator Door	1. After removing the screw, disassemble the Upper Right Hinge Cover with opening door.	
	2. Disconnect electric wire on the top of the refrigerator.	
	3. With the 7/16 inch wrench, remove the three bolts that hold the top of the refrigerator.	

Door Removal – Bottom Mount Model

Refrigerator Door	4. Remove the screw that hold the ground wire.	
	5. Separate Hinge from electric wire and ground wire as shown below.	
	6. Disassemble the fridge door by lifting it upward. Be careful not to drop and scratch the fridge door.	

Door Removal – Bottom Mount Model

Refrigerator Door	7. Separate the Cap assembled on the Middle Hinge.	
Freezer Door	1. After removing the screw and two bolts, disassemble Middle Hinge.	

Door Removal – Bottom Mount Model

Freezer Door	2. Remove/Disassemble the Middle Hinge connected to the Freezer.	
	3. Disassemble the Freezer door by lifting it upward. Be careful not to drop and scratch the Freezer door	
	4. Disassemble the Cap on the Low Hinge.	

Chapter 6

Best Refrigerator Repair Practices

Refrigerator Truck Stock Recommendations Part 1

- **The recommended truck stock items list updated bi- monthly please check the TechTalk Newsletter for the most updated listing**

( ) = Stock Quantity

(4) DA47-10160H Bi-Metal to replace all Thermal Fuses
(1) DA67-00466B Water Filter Bypass Cap (used to verify filter operation)
(1) DA62-00914B Water Valve
(2) DA73-30102E Drier
(2) DA73-30102F Drier
(1) DA31-00010C (DA31-00015A, DA31-00015B, DA31-00015C, DA31-00010D, DA31-00010F) Condenser Fan Blade
(1) MK183CL2U/E01 (MK183CL2U/E07) Compressor

Defrost Sensor Common Part Number

(4) DA32-00006W -- Defrost Sensor with longest wires

Note: Replacement refrigerator water filters will no longer be considered a service item and will exclusively be handled by Samsung sales and marketing groups.

Refrigerator Truck Stock Recommendations Part 2

- **The recommended truck stock items list updated bi- monthly please check the TechTalk Newsletter for the most updated listing**

( ) = Stock Quantity

Motors

(1) DA31-00020E DC Evaporator Fan Motor
(1) DA31-00002V A/C Evaporator Fan Motor
(1) DA31-00020H DC Condenser Fan Motor
(1) DA31-00103A Condenser Fan Motor

Ice Makers with sensor

(1) DA97-00258E Description: ASSY ICE MAKER
(1) DA97-00258C Description: ASSY ICE MAKER
(1) DA59-00294A Description: ASSY ICE MAKER
(1) DA97-00258J Description: ASSY ICE MAKER
(1) DA97-05422A Description: ASSY ICE MAKER All Heat Release

Chapter 7

SAMSUNG

Window Air Conditioner

Window Air Conditioner Error Code

ERROR	7 Segment LED Display
Room Temperature Sensor (open or short)	E1 is displayed

Air Conditioner Troubleshooting Pt 1

Check the basic checkpoints first to determine whether it is machine trouble or a problem in the operation method. When it is not related to the basic checkpoints, perform checking in accordance with the procedures of troubleshooting by symptom.

7-1 Basic Checkpoints for Troubleshooting

1) Is the voltage of the power source appropriate ?

- ➢It should be within the rating voltage ±10% range.
- ➢The air conditioner may not operate properly when the voltage is out of this range.

2) Is the connection with the fan motor, compressor wire, and starting condenser appropriately made ?

3) The symptoms listed in the table below are not indicative of machine trouble.

Troubleshooting

Symptom	Cause and check
No operation	• Check whether there is power failure or the power plug is pulled out. • Check whether the unit is stopped as a result of completion of the sleep time. • Pull out the power plug for ten seconds, and then insert it again.
Air flows, but no cooling	• Check whether the Air filter is clogged with dust or is dirty. • Check whether the desired temperature is too high. Set the desired temperature to a lower level than the current temperature. • Check whether it is in "FAN" mode.
The remocon does not operate	• Check whether battery is completely depleted. • Check whether the battery is properly inserted. • Check whether the receiving window of the remocon for the assembly main PCB is blinded. • Check whether the remocon is affected by jamming due to a neon sign.
No temperature setting	• Check whether the unit is in "FAN" mode. (In "FAN" mode, only the current temperature is displayed, and the desired temperature is not set.)

※ Checking and Display of Fault Area

Troubleshooting

No Power

(1) Is the voltage of the power source normal? (the rating voltage ±10% range.)

(2) Are the electric wires making good contact? (CN 71, RY 71)

(3) Is the output voltage of regulator IC01 (KA 7812) normal? (DC 11.5V ~ DC 12.5V)

(4) Is the output voltage of the regulator IC02 (KA 7805) normal? (DC 4.5V ~ DC 5.5V)

Troubleshooting

The Membrane Key Pad And Led Display are not working

(1) Is the voltage of the power source normal? (the rated voltage ±10% range.)

(2) Are the electric wires making good contact? (CN71, RY71)

(3) Is the connection between the main PCB assembly, and MEMBRANE KEY PAD making good contact? (CN91)

Troubleshooting

The Remote Control Is Not Working

(1) Is the voltage of the power source normal? (the rated voltage ±10% range.)

(2) Are the electric wire making good contact? (CN71, RY71)

(3) Is the main PCB assembly making good contact with the MEMBRANE KEY PAD (CN91)

(4) Is the battery voltage of the remote control above 2.7VDC?

Troubleshooting

The Compressor is Not Operating

(1) Is the voltage of the power source normal? (the rated voltage ±10% range)

(2) Is the desired temperature lower than the indoor temperature in the “COOL” mode? (Compressor stopped)

(3) Are the starting condenser connectors making good contact?

(4) Are the electric wires in good condition and making contact? (CN71, RY71)

(5) Is the output voltage of the regulator IC01 (KA7812) 12VDC and IC02 (KA7805) 5VDC normal ?

Troubleshooting

The Fan Motor does not Operate

(1) Is the voltage of the power source normal? (the rated voltage ±10% range.)

(2) Are the electric wire making good contact? (CN71, RY71)

(3) Are the starting condenser (FAN MOTOR) wires making good contact?

(4) Is the fan motor connector making good contact? (CN73)

(5) Is the output voltage of the regulators IC01 (KA7812) and IC02 (KA7805) normal?

Checking Compressor Oil

To check the condition of the oil, fill a transparent container with a 10cc sample of oil, and then compare color and odor to the chart.

Oil Quality

Condition of Refrigerant Cycle	Oil Condition		Remarks
	Color	Odor	
Normal	Straw Yellow	No Odor	Return with the system
Over-heated	Brown Color	-	Change the oil
Compressor Damage	Dark Brown	Pungent oil	Change the oil

Replacing and refilling the refrigerant oil

1. Change the compressor - DO NOT recharge the oil as the compressor itself is already charged.
2. Change the condenser .... add 50cc
3. Change the evaporator .... add 50cc
4. When the refrigerant is replaced .... add 30cc oil.
5. After vacuum is completed, the oil is filled through the high pressure side.
6. In the event of a refrigerant leak, generally it is not necessary to add oil. (Unless the oil has leaked significantly.)

Chapter 8

SAMSUNG

Dishwasher

2008 Dishwasher

DMR57

DMR77

ApplianceTechnical Training

Product Overview

This DMR57 and DMR77 offers unique features and user flexibility. The sleek design creates a custom built kitchen look. The safety features and quiet design will provide reliable operation.

Product Specifications

Model name	**DMR 77LFS** **DMR 57LFS**
Power Supply	**Single phase AC 110V / 60Hz**
Water Pressure	**20 ~ 120 PSI.**
Wash spray method	**Rotating nozzle spray type**
Drying method	**Fan driven condensing system**
Power consumption	**Standard cycle: 1.03 KWh ± 10%**
Power	**Circulation Motor: 170W±15% or below** **Heater: 1100W±10% or below** **Drain Pump: 45W±15% or below** **Fan Motor: 5.5W±15% or below**
Water consumption	**5.2 Gallons ± 15% or below**

Main Features	▪ Capacity: 14 place settings ▪ Control panel design - Touch Sensor panel & LED Display - DMR77 : Hidden type - DMR57 : Front type ▪ Dimension (W x D x H) : 23.8 x 24.7 x 33.9 inch

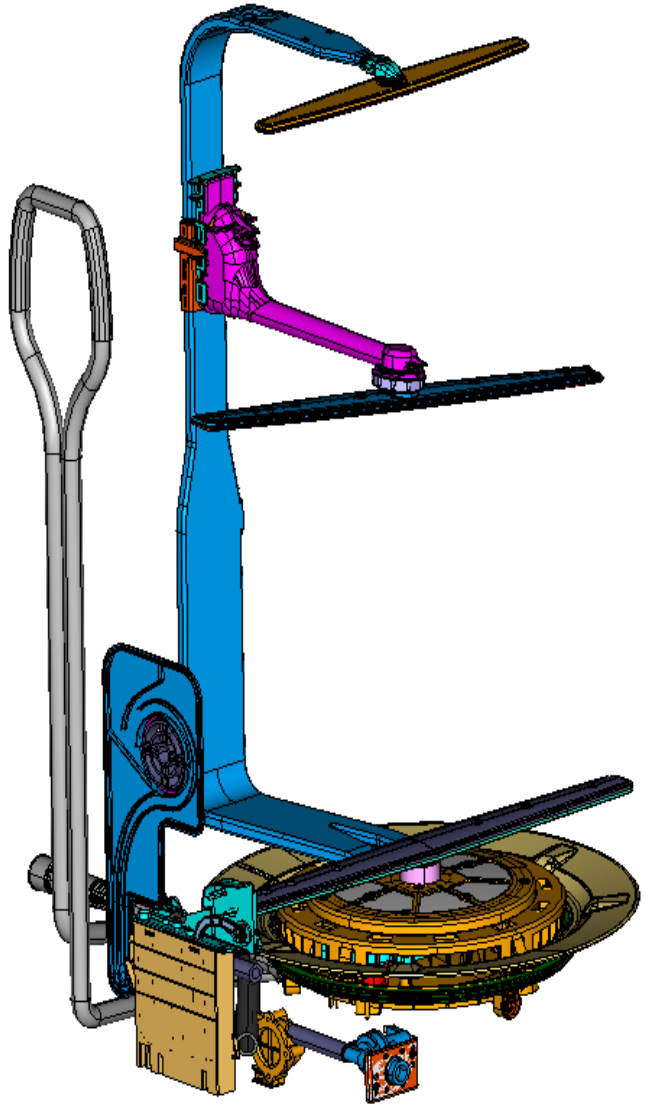
Product Comparison Specification

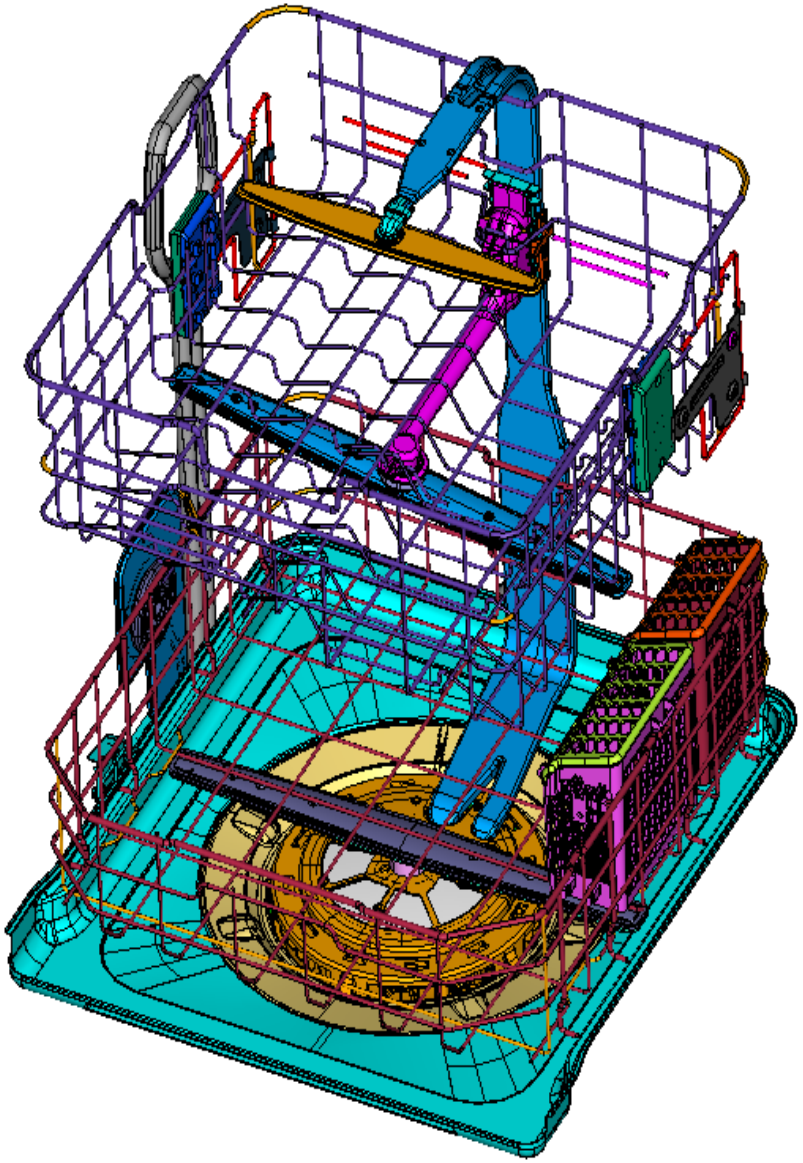
	DMR77LHS	DMR57LFS
Capacity	14 place settings	14 place settings
Display	Graphic LED	Graphic LED
Control Type	Touch Sensor	Touch Sensor
Control height	5.1 inches	5.1 Inches
Front Display	PC 3.5t	-
Washing Program	Normal, Heavy, Delicate, Rinse, Quick, Smart Auto	Normal, Heavy, Delicate, Rinse
	Delay Start, Sanitize, Half Load	Delay Start, Sanitize
Water Supply	Hot water only	Hot Water Only
Basket Color	Gray Color (Nylon Coating)	Gray Color (Nylon Coating)
Basket	Stair Style Basket	Stair Style Basket
Sensor	Inlet/Temp/Water Level/Rinse/Leakage	Inlet/Temp/Water Level/Rinse/Leakage
Rinse Supplement Direction	Yes	Yes
Half Load capable	Yes (Upper)	No
Filter	3-stage (Disposer Type)	3-stage (Disposer Type)
Heater	Internal Type (1100W)	Internal Type (1100W)
Dryer Type	Fan driven condensing system	Fan driven condensing system
Program Lock	Child Lock Button	Child Lock Button
Delay Start	1~ 24hr	1~24hr
SIZE	23.8×24.7×33.9 inch (W×H×D)	23.8×24.7×33.9 inch (W×H×D)

Model Number Nomenclature

DM	R	7	7	L	H	S
D: Dishwasher M: Machine	7: Best 5: Better	**7: Design year**	L: Buyer Code	Panel Control H: Hidden F: Front	Color S: Stainless B: Black W: White	

Water Flow Path



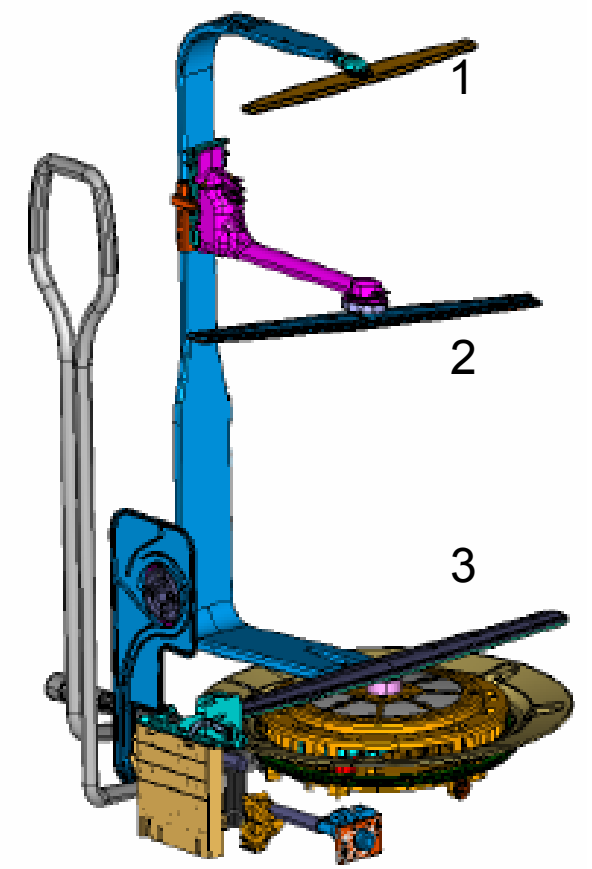


Water Flow

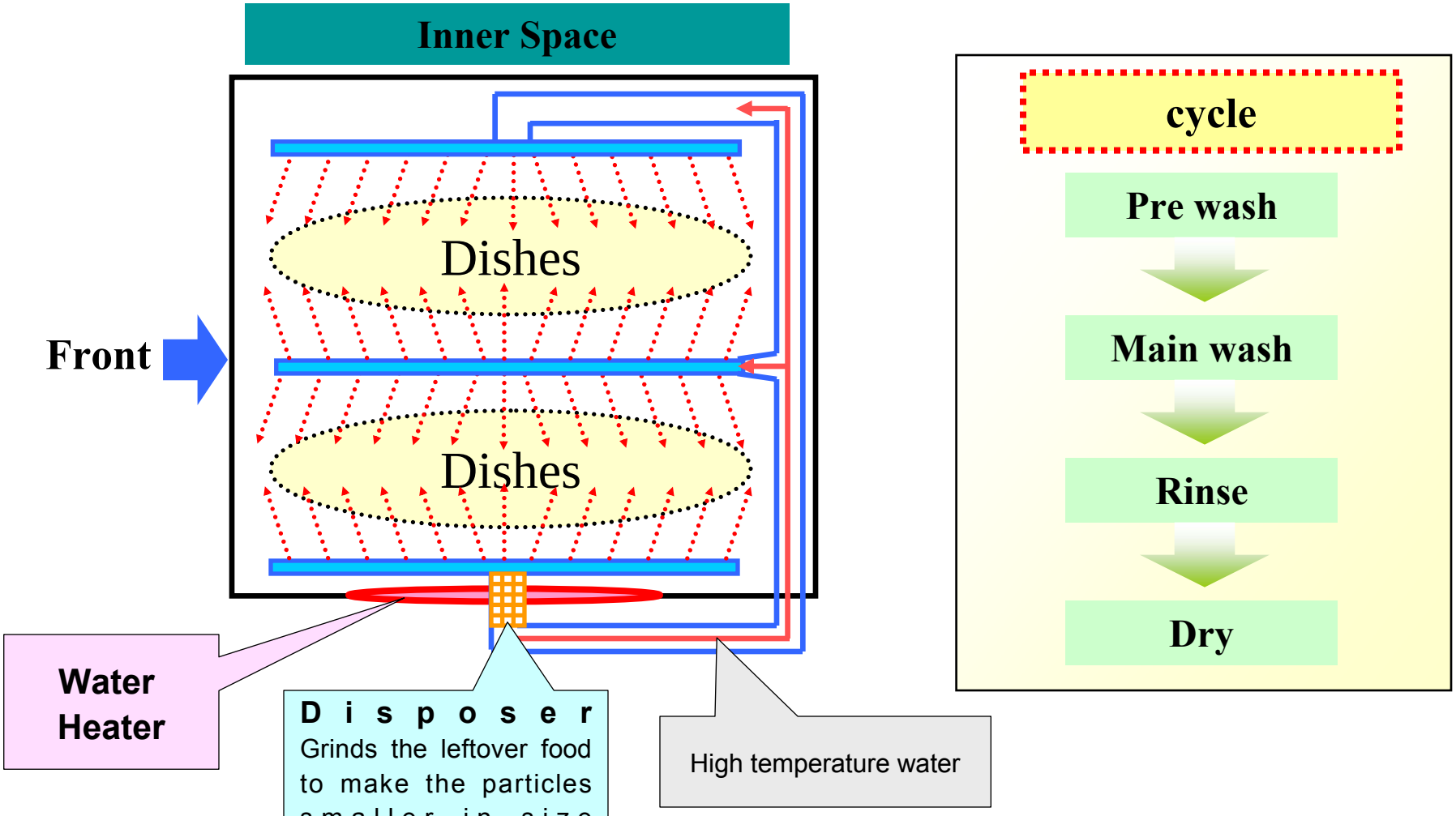
Samsung uses 3 wash arms, top (1), middle (2), and bottom (3).

The main water spraying arm in the middle is tilted. Its tilted shape sprays the water effectively in all parts of the machine. This is important for washing 14” Plates

Conventional washers use a spray wash pattern that sometimes may not reach all of the dish racks equally. The unique spray arm style distributes water to the entire drum promoting even cleaning.



Operating Principles



Fan Driven Condensation Drying

Samsung's drying system is the fan-driven condensation type, which protects your kitchen and children, creating no steam from the machine when drying compared with vent drying system. This also speeds dish drying time.

Samsung's drying system is the fan-driven condensation type, it uses residual heat from the warm water inside the tub and the fan at the same time for efficient drying.

Delay Start / Sanitize Operation

Delay Start Operation

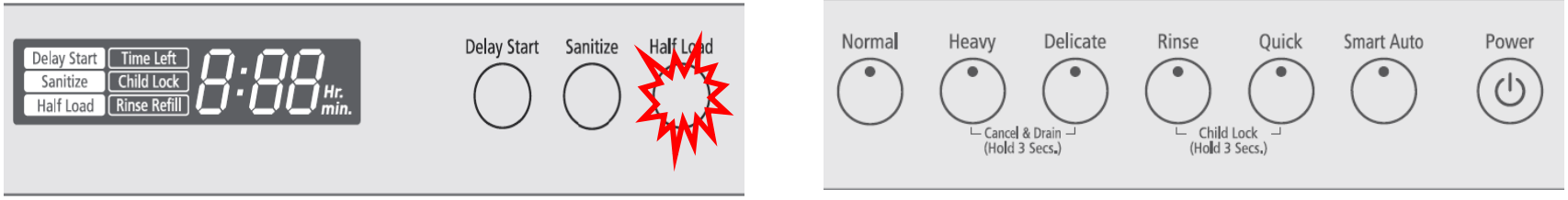
- Maximum Delay Time 24 Hours
- Each button press postpones the start by 1 hour
- Press Power to cancel

Sanitize Operation

- Enables High temperature cycle
- At 3th Rinse step, the water temperature is increased to a maximum temperature of 162°F. When [Sanitize] is not selected, the maximum temperature reaches 140 °F
- When [Rinse] Cycle is selected, you cannot select the [Sanitize] button.
- When the [Sanitize] button is selected, the Cycle time can be extended.

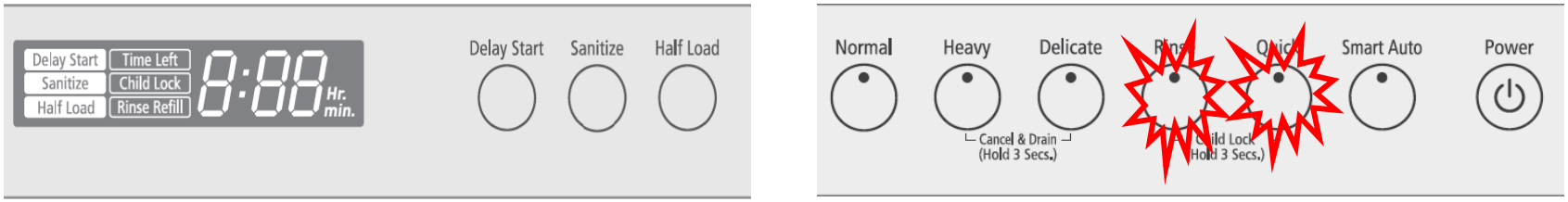
Unique Functions

Half Load



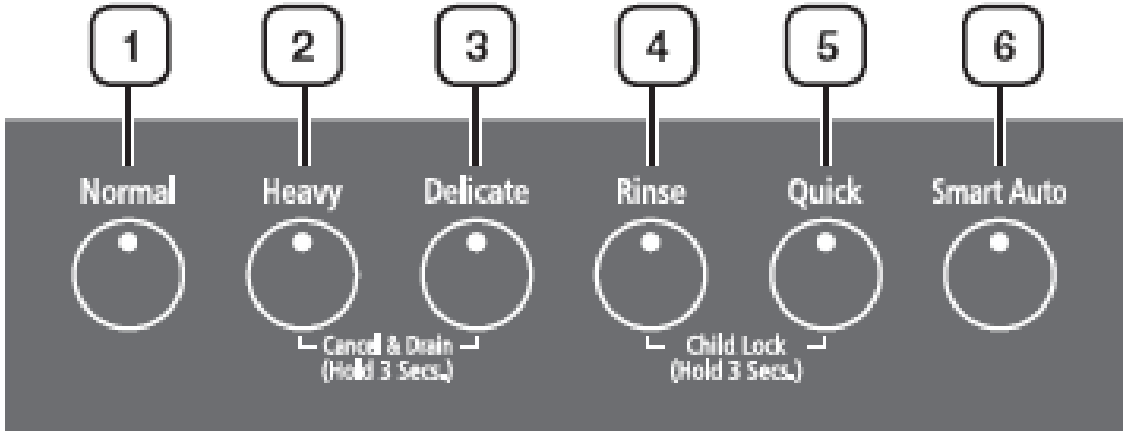
● Selecting this option runs the upper spray arm only, Select this option to wash a small load of dishes.

Child Lock



● [Child Lock] is selected by pressing the [Rinse] Button and [Quick] Button simultaneously for 3 seconds. You must press for 3 seconds again to cancel the selection.

Cycle Explanation



1	Normal	Use this cycle for regular dinner dishes.
2	Heavy	Use this cycle for hard-to-clean, heavily soiled dishes, pots, pans, and dishes with heavy oil.
3	Delicate	Use this cycle for normally soiled dishes or fragile items such as glasses.
4	Rinse	Use this cycle for pre-cleaned dishes or glasses. No detergent is dispensed and no dry cycle is initiated.
5	Quick (only DMR77)	Use this cycle for lightly soiled dishes. Detergent is dispensed but no dry cycle is initiated.
6	Smart Auto (only DMR77)	This cycle detects the level of soil and automatically initiates the optimal cycle after a few minutes of operation.

Cycle Selection Time Chart

Program	Drain	Pre-wash 1	Pre-wash 2	Pre-wash 3	Main wash	Rinse 1	Rinse 2	Last Rinse	Dry	Total Time
Normal	**0:45**	**16:30**	**(16:30)**	**-**	**32:30**	**7:30**	**(7:30)**	**32:30**	**20**	**110~134**
Heavy	**0:45**	**17:30**	**17:30**	**17:30**	**46:30**	**7:30**	**7:30**	**46:30**	**20**	**181**
Delicate	**0:45**	**16:30**	**-**	**-**	**37:30**	**7:30**	**-**	**32:30**	**20**	**115**
Rinse	**0:45**	**-**	**-**	**-**	**-**	**9:30**	**-**	**-**	**-**	**11**
Quick	**0:45**	**5:30**	**-**	**-**	**11:30**	**7:30**	**-**	**12:30**	**-**	**38**
Smart Auto	**0:45**	**5:30 ~17:30**	**(17:30)**	**(17:30)**	**11:30 ~46:30**	**7:30**	**(7:30)**	**12:30 ~46:30**	**20**	**58~181**

Program	Pre-wash 1,2,3	Main wash	Rinse 1,2	Rinse 3	
				No Sanitize	Sanitize
Normal	-	120˚F	-	140˚F	162˚F
Heavy	-	149˚F	-	158˚F	162˚F
Delicate	-	113˚F	-	140˚F	162˚F
Rinse	-	-	-	-	-
Quick	-	113 ˚F	-	140˚F	162˚F
Smart Auto	-	113~149˚F	-	140~158˚F	162˚F

- **The wash time may vary depending on the water pressure, drain conditions, and temperature of the supplied water. The Auto Wash cycle is not timed.**

Cycle Time Chart

MICOM cycle

Program chart [time (min), temperature]

Program	Drain	Pre-wash 1	Pre-wash 2	Pre-wash 3	Main wash	Rinse 1	Rinse 2	Rinse 3	Dry	Total Time
Normal	**0:45**	**16:30**	**(16:30)**	**-**	**32:30**	**7:30**	**(7:30)**	**32:30**	**20**	**110~134**
Heavy	**0:45**	**17:30**	**17:30**	**17:30**	**46:30**	**7:30**	**7:30**	**46:30**	**20**	**181**
Delicate	**0:45**	**16:30**	**-**	**-**	**37:30**	**7:30**	**-**	**32:30**	**20**	**115**
Rinse	**0:45**	**-**	**-**	**-**	**-**	**9:30**	**-**	**-**	**-**	**11**
Quick	**0:45**	**5:30**	**-**	**-**	**11:30**	**7:30**	**-**	**12:30**	**-**	**38**
Smart Auto	**0:45**	**5:30 ~17:30**	**(17:30)**	**(17:30)**	**11:30 ~46:30**	**7:30**	**(7:30)**	**12:30 ~46:30**	**20**	**58~181**

Program	Pre-wash 1,2,3	Main wash	Rinse 1,2	Rinse 3		
				No Sanitize	Sanitize	
Normal	-	120˚F (49˚C)	-	140˚F (60˚C)	162˚F (72˚C)	
Heavy	-	149˚F (65˚C)	-	158˚F (70˚C)	162˚F (72˚C)	
Delicate	-	113˚F (45˚C)	-	140˚F (60˚C)	162˚F (72˚C)	
Rinse	-	-	-	-	-	
Quick	-	113 ˚F (45˚C)	-	140˚F (60˚C)	162˚F (72˚C)	
Smart Auto	-	113~149˚F (45~65˚C)	-	140~158˚F (60~70˚C)	162˚F (72˚C)	

Cycle Operation Description

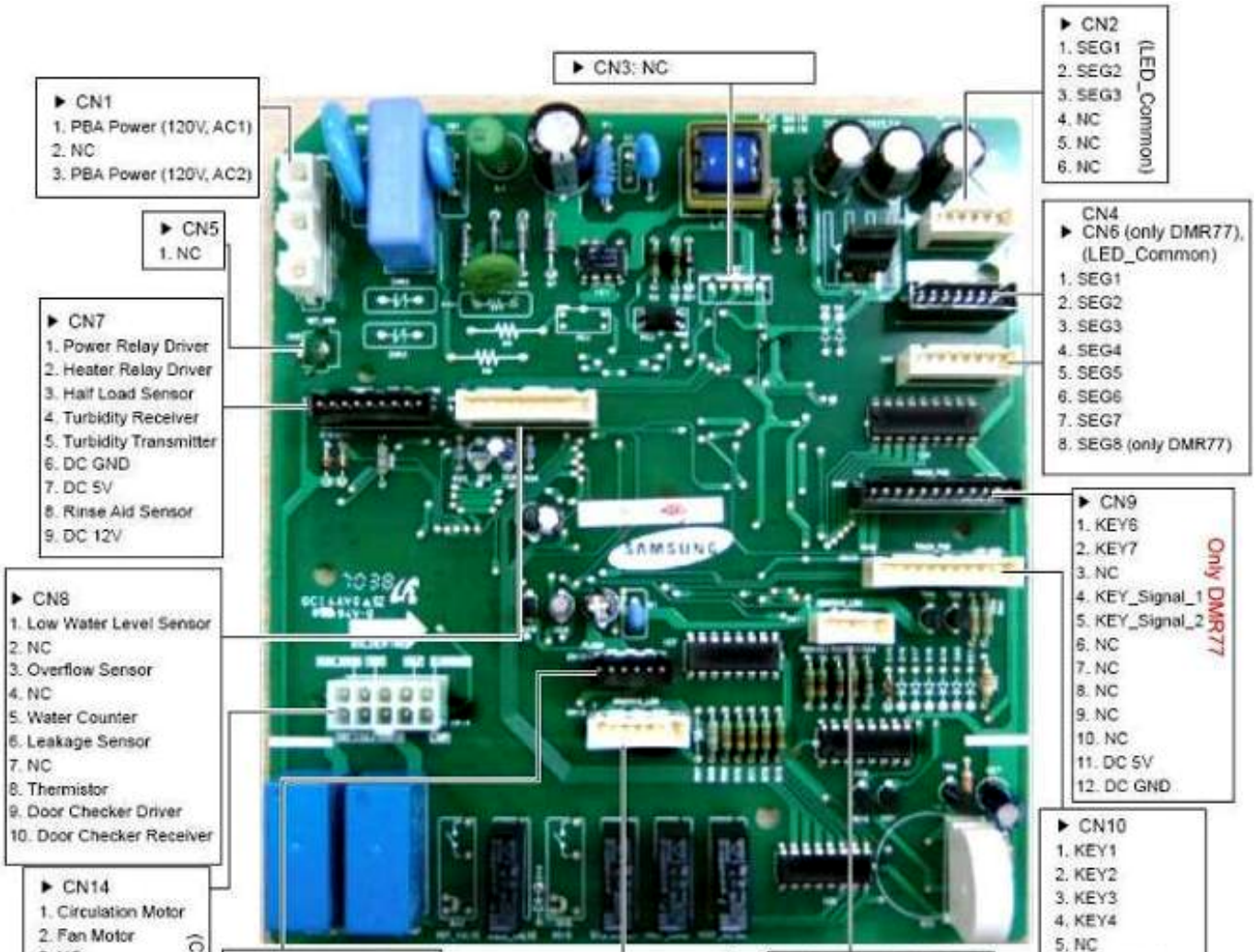
Cycle name	Explanation	Comments
Pre- wash	Tub Fills with water	
Water Heating	After the water supply is completed, the heater may turn on to heat the water depending on the selected cycle.	
Detergent Dispensing	3 minutes after the fill operation is complete, the detergent dispenser opens	
Main wash	Circulation Motor Runs Only -	
Rinse	The number of Rinse Cycles (1-3) is determined by cycle selection.	For the [Normal], [Heavy], [Delicate], [Quick] and [Smart Auto] cycles, the last Rinse cycle is a heated rinse. (140˚F for Normal, 158˚F for Heavy and 162˚F for sanitize)
		▶ The amount of Rinse Agent added can be set by the user. (4 levels)
Dry	20 Minutes – the fan operates for the last two minutes only	Dry cycle is included for all cycles except the [Rinse] & [Quick] cycle.

Rinse Cycle Time						
	Normal	Heavy	Delicate	Rinse	Quick	Smart Auto
Rinse1	7:30	7:30	7:30	9:30	7:30	7:30
Rinse2	(7:30)	7:30	-	-	-	(7:30)
Rinse3	32:30	46:30	32:30	-	12:30	12:30~46:30

Chapter 9

Dishwasher Troubleshooting

Main PCB Connector Layout



Error Code List Part 1

Error type	Error Mode	Occurring condition	Expected condition
Water supply Error	4E	1. When the pulse of 100 or less is detected even 1 minute after the water supply 2. When flow meter pulse is 5 or less 5 seconds after the water supply starts 3. When the water supply does not occur 5 minutes after the water supply starts	Water supply valve defect - a normally operating water valve should measure ~ 1200 Ω out of the circuit. Also verify the 120VAC supply from the main PCB is present Flow Meter defect Foreign particles within water supply valve Water supply valve terminal not connected Main PBA defect
	4E1	When 176 ℉ or above is detected during water supply	Thermistor Defect Water supply temperature of 176 ℉ or above Main PBA defect
Drain Error	5E	When OFF status of Low Level switch is not detected within 3 minutes during the drain	Drain pump defect – a normally operating drain pump should measure ~ 25 Ω out of the circuit, also verify the 120VAC supply from the main PCB is present Low Level Sensor defect Foreign particles clogging mater drain hose Drain valve terminal not connected Main PBA defect
Overflow Error	oE	When overflow detection AD data is 4.0V or below for 3 seconds (When leakage sensor detects 4.0V or below for 1 seconds during water supply)	Foreign particles within water supply valve Case Sensor part leakage Flow Meter defect Main PBA defect
Leakage Error	LE	When leakage sensor detects 4.5V or below for 1 seconds	Base part hose connection defect Sump and Tub assembly defect Drain Pump assembly defect Main PBA defect

Error Code List Part 2

Error type	Error Mode	Occurring condition	Expected cause
Heater Error	HE	When the temperature change is 39 ℉ or less within the first 10 minutes after the heating starts	Heater defect Heater Relay defect Heater terminal not connected Main Wire-Harness defect Main PBA defect
	HE1	When the temperature of the Thermistor is 176 ℉ or above for more than 3 seconds	Heater Relay defect Normal: ~ 13Ω Thermistor defect Main PBA defect
Temperature sensor Error	tE1	When 0.2V or below, or 4.5V or above is maintained for over 3 seconds	Thermistor terminal not connected Thermistor Defect Main PBA defect
Low water level Error	9E	When Low Level is detected to cause Error even after the water supply resumes after Low Level is detected for the 1st time	Low Level Sensor defect – 0.5V when the switch is closed Low Level Sensor terminal not connected Main PBA defect
Button Error	bE2	When the button is pressed continuously for over 30 seconds	Sub PBA defect Main PBA defect
Half load function error	PE	When micro switch is not detected for over 30 seconds after the Distributor motor starts	Distributor motor defect Micro switch terminal not connected Main PBA defect

Water Supply Operation

Water supply cycle

A. Water supply function in the cycle starts 3 seconds after the drain function is completed.

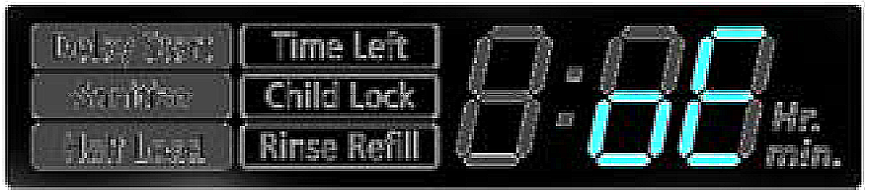
B. When the there is no pulse input from the water supply valve after the water supply starts, the ERROR "4E" will be displayed.

C. The amount of water supplied is about 1.1 ~ 1.8 gallons. The amount of water supplied depends on the variances of flow meter, water pressure and inlet valve etc.

D. When Over-flow level is detected, the ERROR "oE" is displayed.

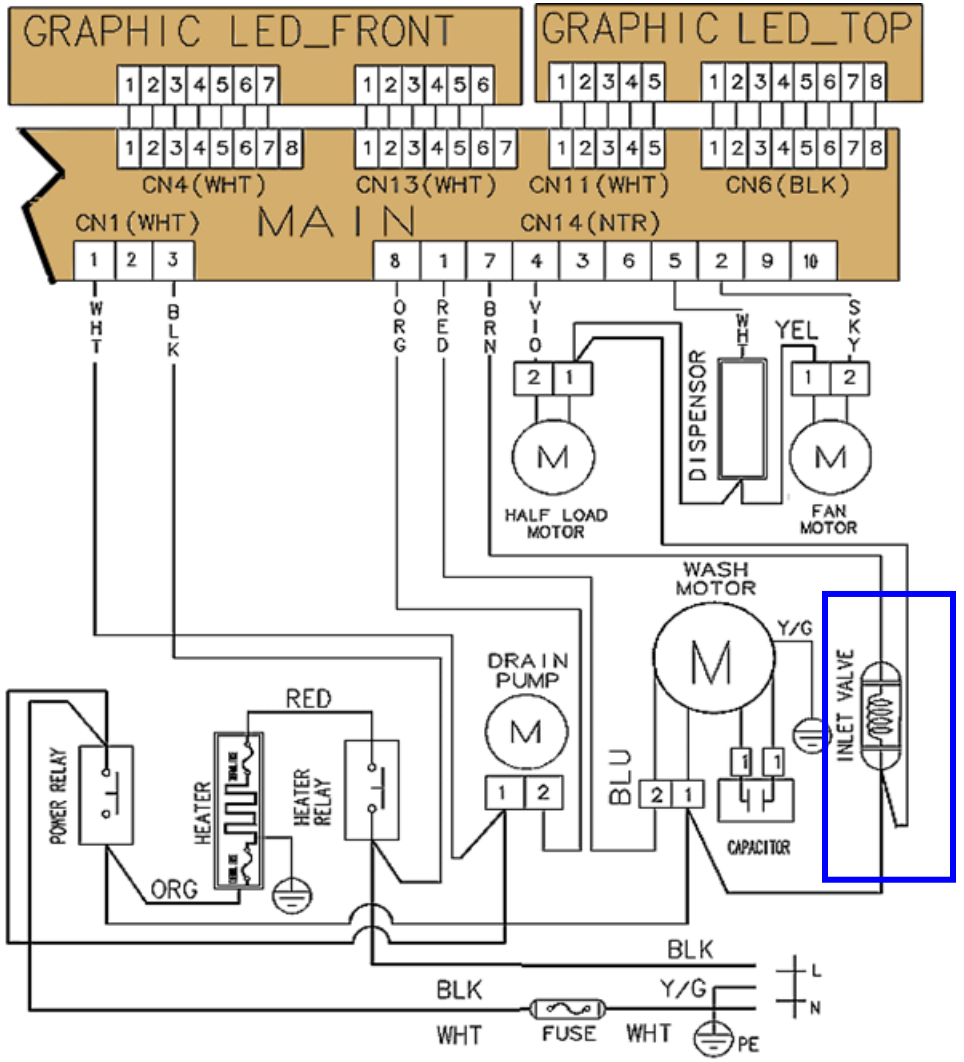
E. When the water supply is not completed within 5 minutes, the ERROR "4E" is displayed.

Water Valve Error Codes



- Error Code "oE" is displayed when the case sensor is triggered. "oE" is usually caused by a defective fill valve.

- Error Code "4E" is displayed if there is no pulse input from the water supply valve after the water supply starts. "4E" may also be displayed if the fill time exceeds 5 minutes. "4E" can be a problem with the external water supply, a restricted hose or a defective water valve.



Drain Cycle Operation

A. Drain cycle operates when the operation button is initially entered or 1 second after the wash and rinse cycle are completed.

B. Drain function is executed as follows.

Remove remaining water (Initially press operation button)	**Check float S/W after 45 seconds from the power is turned on**
Drain cycle	**Check float S/W after 70 seconds from the power is turned on**

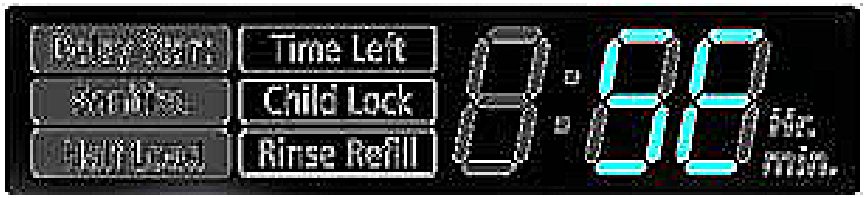
End function

A. When all of the cycles within the selected cycle is executed, this function is executed.

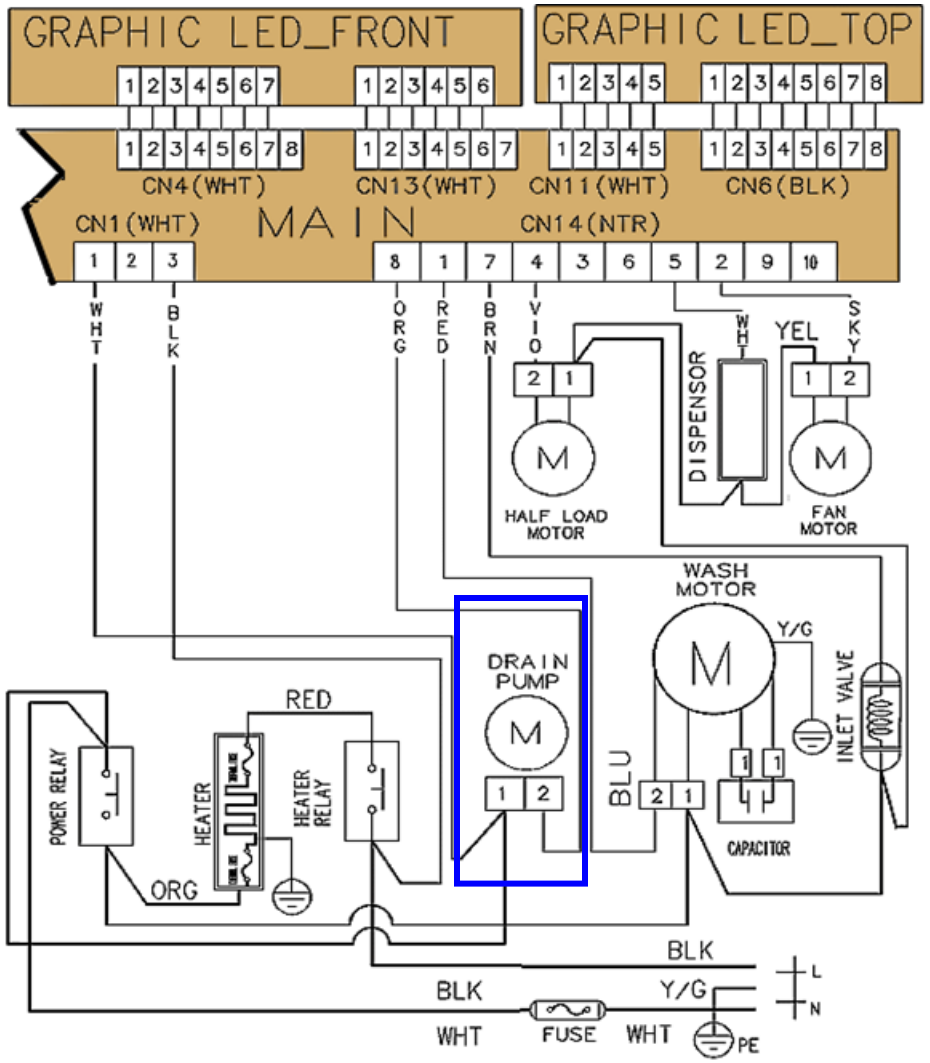
B. During this function, the End sign is displayed with the MELODY generated.

C. After the selected cycle is completed, the power automatically turned OFF.

Drain Pump Operation



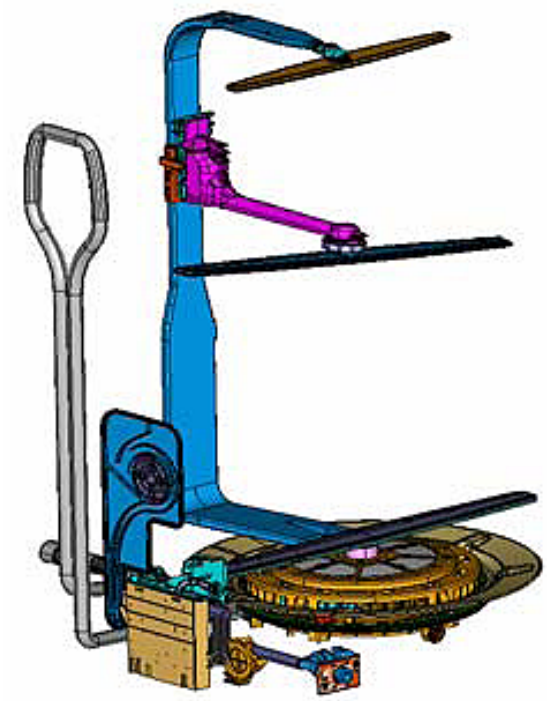
- The Drain pump operates when an operation button is initially entered or one second after the wash and rinse cycles are completed. Normally the drain pump operates for 30 to 45 seconds. 70 seconds after the cycle ends the float switch is monitored. The float switch feeds back to the main CPU that the tub is empty. Error “5E” indicates the tub is not empty. Error “5E” can be a restricted drain hose or a defective drain pump. The drain pump should measure ~ 25 ohms.



Circulation Pump Operation

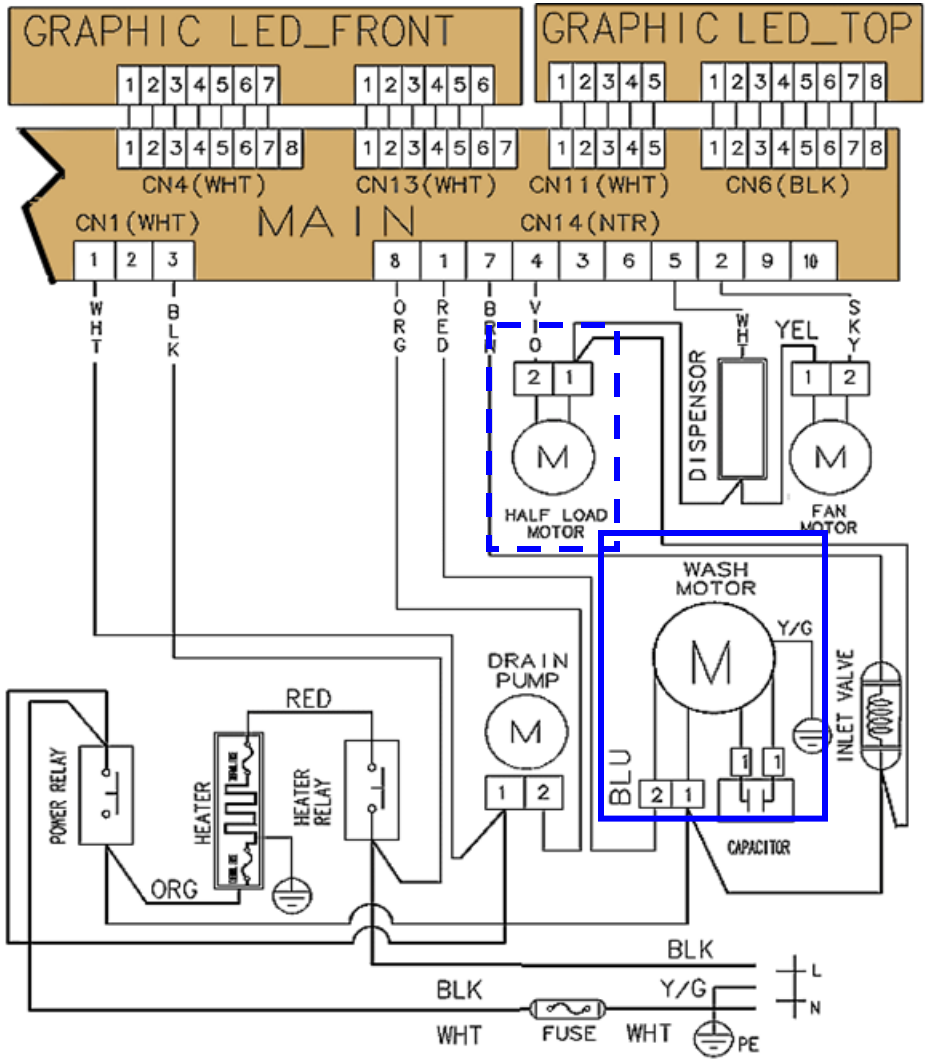
- The circulation pump and three spray arms jet water onto the dishes.

- Besides spraying water onto the dishes the circulation pump includes a disposer. The disposer grinds up food particles using a hardened steel blade and a filter screen. Once the particles are ground small enough they flow through the screen out with the discharge water.



Circulation Pump Error Code

- "t2" is displayed if there is a circulation pump error. This can be a low water condition or a problem with the pump. Verify the drive signal is reaching the pump prior to replacing the circulation pump.

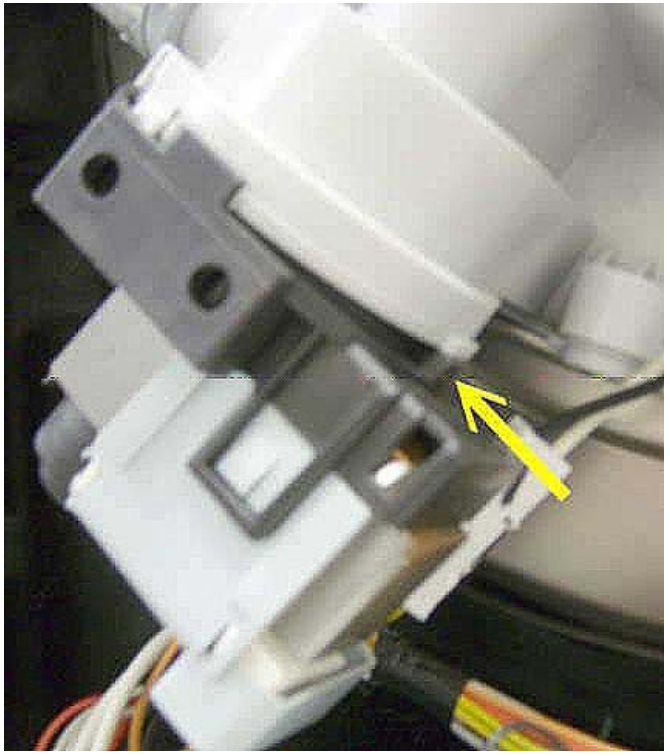


DMR-77 model only

Dishwasher Drain Pump Service Procedure

Model: DMR77LHS / DMR57LHS
Defect Symptoms:

1) **Dishwasher leaks water**
2) **Dishes will not dry**
3) **Dishwasher will not drain**
4) **Dishwasher will make noise**



If the drain pump isn't seated properly you will notice a separation as exhibited in Figure 1. This separation could happen anywhere on the pump, the sides, or the back. If the pump doesn't seat right in the housing it will leak and LE error code will be displayed. Also depending where the separation occurs the impeller could hit the pump housing causing some noise.

Test Program Modes

PCB TEST MODE

1) Press [Delicate] + [Rinse] + [Power] simultaneously to access this mode
2) All LED's will illuminate then the EEPROM is tested
   - If there is no issue with EEPROM, "EPA" will be displayed. If there is any issue, "Epn" will be displayed.
3) Press the "Normal" Key, to access the test modes
   Note: be sure the door is closed
4) Every time you press the "Normal" Key, it changes from P1 -> P2 -> P3 -> P4.

P1 Mode : Operating part test mode. Every time you press the Delay Start Key, it toggles between run and stop. (Cold water->Circulation Motor->Fan Motor->Drain->Dispenser-> Half Load)
P2 Mode – Not Used
P3 Mode – Not Used
P4 Mode - Touch Key, LED, Display-LED test mode.
Press each button the corresponding LED illuminates after all buttons are pressed all LED's illuminate momentarily.

AGING TEST MODE – Continuous Wash Mode

1) Entry method: Press the "Sanitize+Normal" Key simultaneously when the power is turned on
2) After entering the mode, the display toggles between the total cycle time and total progress time repeatedly every 1 second.
   - To cancel: Turn the power off or press the Sanitize+Normal keys simultaneously

Test Modes Part 1

Mode	Related parts	Possible Error Codes	Activate Mode	Test Notes
t1	Inlet valve, Flow Meter, Low Level Sensor	4E error 9E error	If you press the Delay Start key, water is drained for 45 seconds and then the water supply starts. If the pulse count is more than 660, change the mode. Make sure to change the mode when the pulse count is more than 660 in t1 mode.	Water fill in approximately 70 seconds average water pressure, fills to about 1 inch past heater shield (very little water showing in unit)
t2	Circulation Motor	Nozzle does not spray	1. Press the Delay Start key to start or stop the pump. 2. If a low water level is detected, water is supplied again and the operation continues.	Place some cups on racks and run circulation pump to verify water distribution in tub.
t3	Circulation Motor, Heater, Thermistor	HE error	1. Press the Delay Start key to start or stop the heater and the circulation pump. 2. If a low water level is sensed, water is supplied again and the operation continues. 3. The current temperature is shown on the display. 4. It operates up to 158ºF.	After temp increases 2 degrees F, time is about 50 seconds for each degree F increase
t4	Fan Motor	Fan Motor not working	Press the Delay Start key to start or stop the fan motor.	Listen for fan running

Test Modes Part 2

Mode	Related parts	Possible Error Codes	Activate Mode	Test Notes
t5	Drain Pump, Low Level Sensor	5E error	1. Press the Delay Start key to start the 2 parts. 2. “t5” starts blinking on the display while water is being drained. 3. When draining is finished, “t5” is displayed without blinking.	pump out is approximately 30 seconds
t6	Low Level Sensor	Display error when turning Micro S/W on/off	1. MICRO SWITCH On → The sensing state is displayed as ‘On’ on the 88 segment display. 2. MICRO SWITCH Off → The sensing state is displayed as ‘OFF’ on the 88 segment display.	t6 to OFF with no water – t6 to ON with water
t7	Thermistor	No change in water temperature	The current temperature is displayed.	Actual temp C of water in sump
t8	Synchronous Motor, Micro S/W	PE Error	1. If you press the Delay Start key, the parts operate just once. 2. There is no stop function. 3. While the synchronous motor is operating, its sensing state is displayed as On/OFF on the 88 segment display. 4. When the synchronous motor stops, the sensing state (On/OFF) of the micro switch is displayed.	ON 8 seconds, OFF 4 seconds

Line Test Mode

- TEST mode entry selection button : Heavy + Delicate + Power Button
  → After all-LED indication about 2 second, “Micom-Ver.” and “Software-Ver.” will be indicated.
  Press the “Normal“ button to test the cycle in order

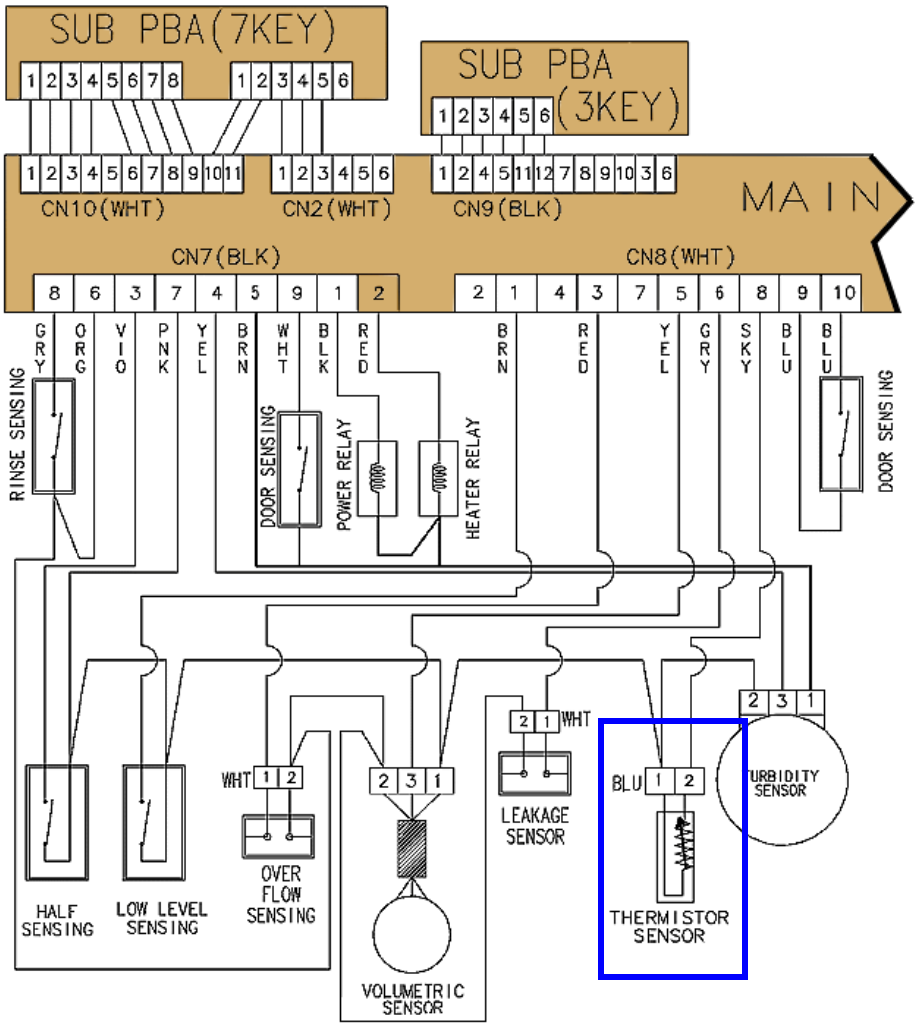
Mode	Display	Note
1 time		Water supply is executed after low level S/W is detected. If water is not supplied it will display the water supply error. When low level is detected after water is supplied, the “9E” error will be displayed
2 times		Operate Circulation Motor.
3 times	H	Operate Circulation Motor. When the temperature is 60℃ or above, the heater is turned “off”. Continuous dispenser operation.
4 times	Sn	Skip to dr in the Better Model. Operate the Circulation Motor after initializing the Synchronous motor to Half Load location.
5 times	dr	Operate Vent Motor and check whether Rinse is refilled.
6 times	L	Supply water.
7 times	S	Supply water. Drain until low level is detected.
8 times	FL	Generate buzzer sound when the Synchronous Motor is initialized to full load location, and the “FL” display flashes.
9 times	Temperature	Display the temperature. Operate each operating part when the key is pressed. (See the below) When the ‘Rinse’ Key is pressed, it toggles between cold water On-Off. When ‘Delicate’ Key is pressed, it toggles between heat On-Off. When the ‘Half Load’ Key is pressed, it toggles between Synchronous Motor On-Off. When a different key is pressed during individual operation of the operating part, operating part is stopped and the applicable operation for the pressed key will start.

Service Test Modes

1) Entry method: Press the “Delay Start+Normal+Power" Key simultaneously for 3 seconds.
2) Display: “t1” is displayed 3 seconds after everything is displayed.
3) It switches to t1->t2->t3->t4->t5->t6->t7->t8 mode depending on the Normal Key entry
   - When operating each mode, the door must be kept closed.
   - If an “oE”, “LE” or “tE1” error occur, make sure to enter Service Inspection Mode after resolving it.

Mode	Related part	Symptoms (Error)	Note
t1	Inlet valve, Flow Meter, Low Level Sensor	4E error 9E error	If you press the Delay Start key, water is drained for 45 seconds and then the water supply starts. If the pulse count is more than 660, change the mode. Make sure to change the mode when the pulse count is more than 660 in t1 mode.
t2	Circulation Motor	Nozzle does not spray	1. Press the Delay Start key to start or stop the pump. 2. If a low water level is detected, water is supplied again and the operation continues.
t3	Circulation Motor, Heater, Thermistor	HE error	1. Press the Delay Start key to start or stop the heater and the circulation pump. 2. If a low water level is sensed, water is supplied again and the operation continues. 3. The current temperature is shown on the display. 4. It operates up to 70ºC.
t4	Fan Motor	Fan Motor not working	Press the Delay Start key to start or stop the fan motor.
t5	Drain Pump, Low Level Sensor	5E error	1. Press the Delay Start key to start the 2 parts. 2. “t5” starts blinking on the display while water is being drained. 3. When draining is finished, “t5” is displayed without blinking.
t6	Low Level Sensor	Display error when turning Micro S/W on/off	1. MICRO SWITCH On → The sensing state is displayed as ‘On’ on the 88 segment display. 2. MICRO SWITCH Off → The sensing state is displayed as ‘OFF’ on the 88 segment display.
t7	Thermistor	No change in water temperature	The current temperature is displayed.
t8	Distributor Motor, Micro S/W (only DMR77)	PE error	1. If you press the Delay Start key, the parts operate just once. 2. There is no stop function. 3. While the Distributor motor is operating, its sensing state is displayed as On/OFF on the 88 segment display. 4. When the Distributor motor stops, the sensing state (On/OFF) of the micro switch is displayed.

Thermistor Sensor Check



Temp. (ºF)	Temp. (ºC)	Resistance (k Ω)
41	5	125.780
50	10	98.323
59	15	77.454
68	20	61.465
77	25	49.120
86	30	39.517
95	35	31.996
104	40	26.065
113	45	21.385
122	50	17.599
131	55	14.579
140	60	12.140
149	65	10.159
158	70	8.542

Thermistor Sensor Chart

No Power Troubleshooting

1. When the power does not come on

The power does not come on.

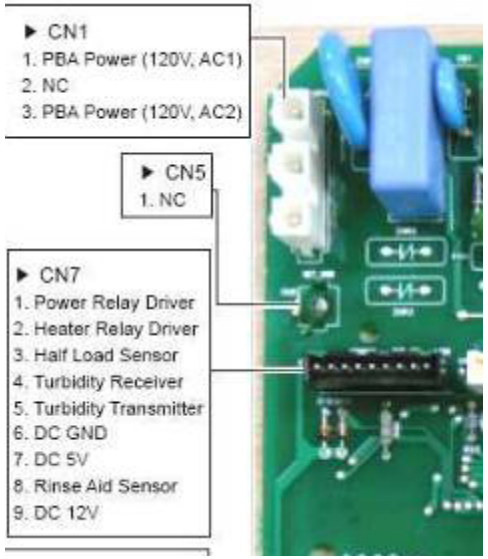
Is the voltage between orange (No. 6) and pink (No. 7) of CN7 connector of main PBA 4.5V or above and the voltage between orange (No. 6) and white (No. 9) 10.5V or above?

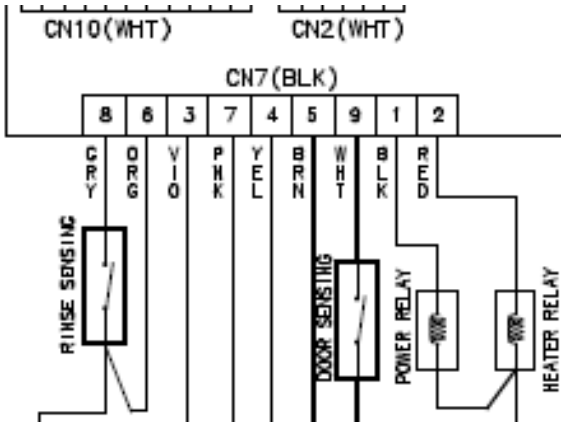
N

The main PBA is defective. Please replace it.

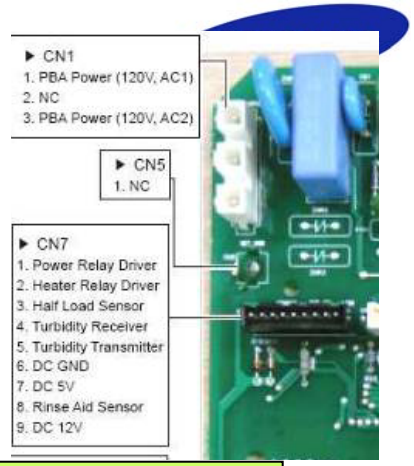
Y

Sub PBA ASSY is defective. Please replace it.





Incorrect LED Display



Front Display incorrect or out

Is the connector of graphic LED seated properly?

N → **Connect the connector firmly.**

Y

Is the condition of graphic LED normal?

N → **Graphic LED is defective. Please replace it.**

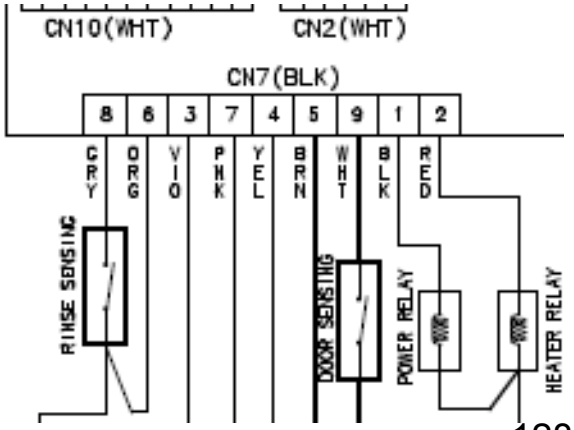
Y

Is the voltage on CN7 between orange (No. 6) and pink (No. 7) 4.5~5.25V and the voltage between orange (No. 6) and white (No. 9) pin 10.5-13V?

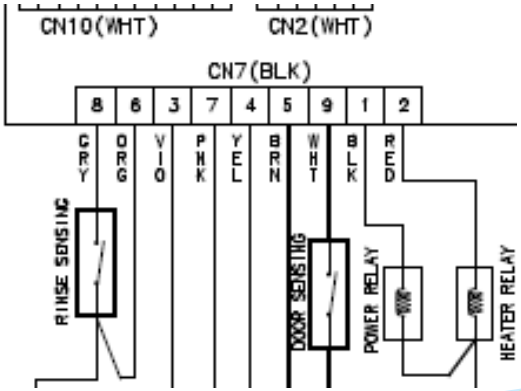
N → **Main PBA is defective. Please replace it.**

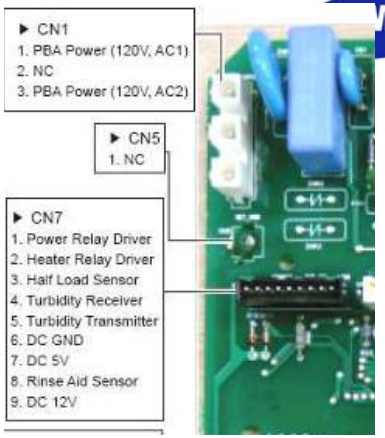
Y

Graphic LED is defective. Please replace it.



No Buzzer Troubleshooting





Can't hear the buzzer sound and the display part is not turned on.

Is the power switch ON?

N → **Turn on the power switch. (All selection switches are valid only when the power switch is turned ON.)**

Y

Is the SUB PBA connector properly seated?

N → **Connect the connector firmly.**

Y

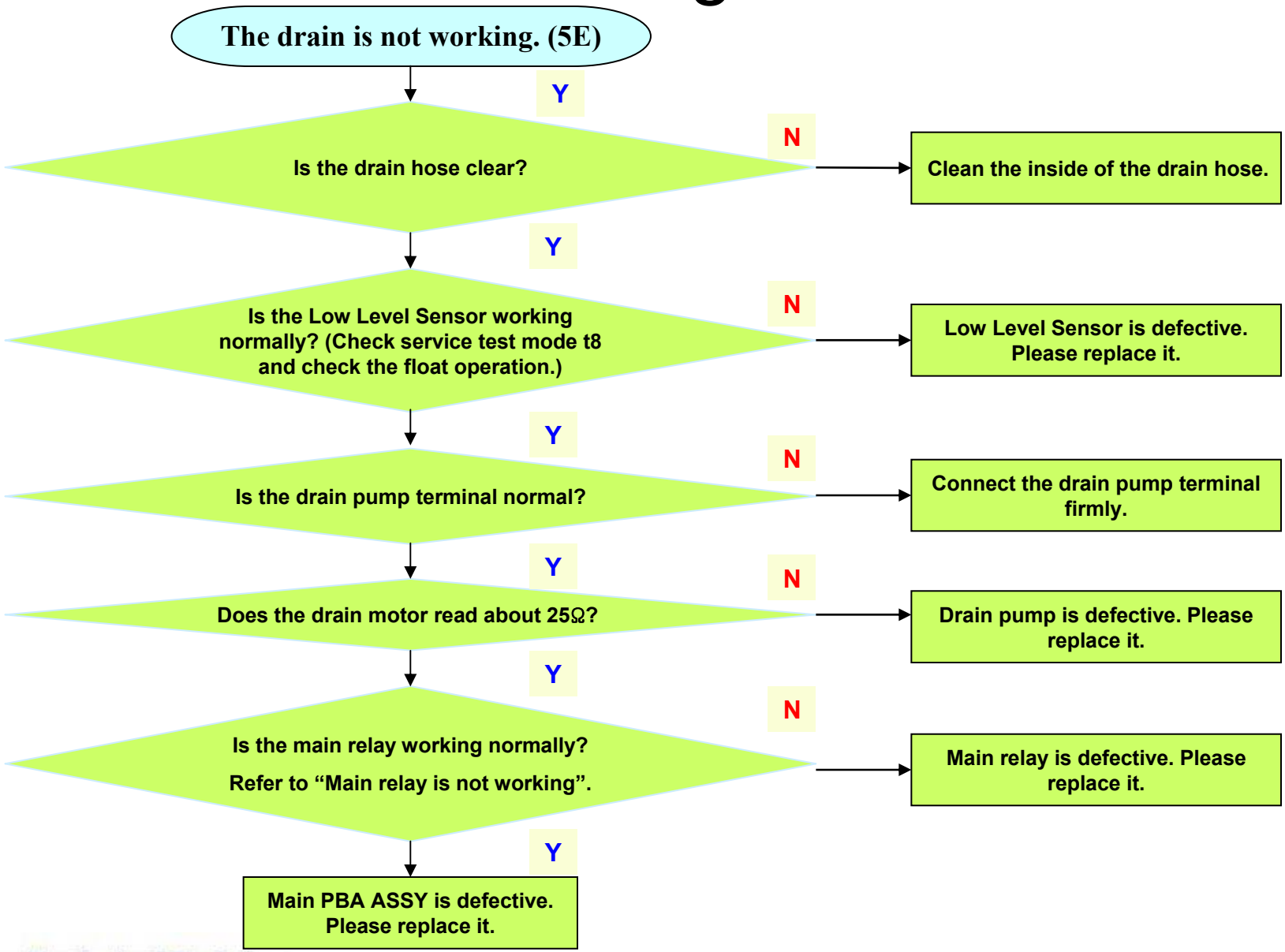
Is the voltage on CN7 between orange (No. 6) and pink (No. 7) connector of main PBA 4.5V or above and the voltage between orange (No. 6) and white (No. 9) 10.5V or above?

N → **Main PBA is defective. Please replace it.**

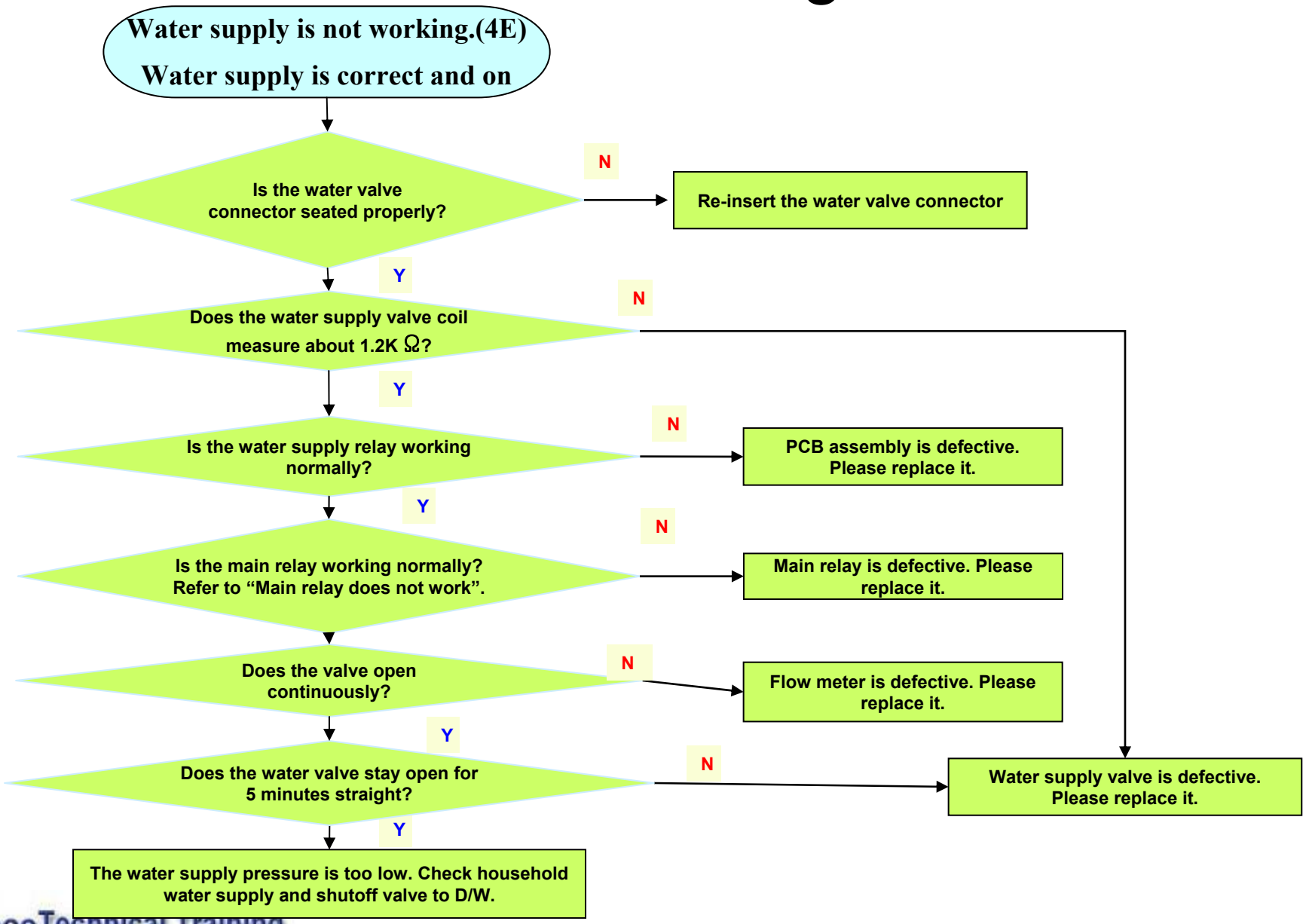
Y

SUB PBA ASSY is defective. Please replace the Control Pane ASSY.

No Drain Troubleshooting

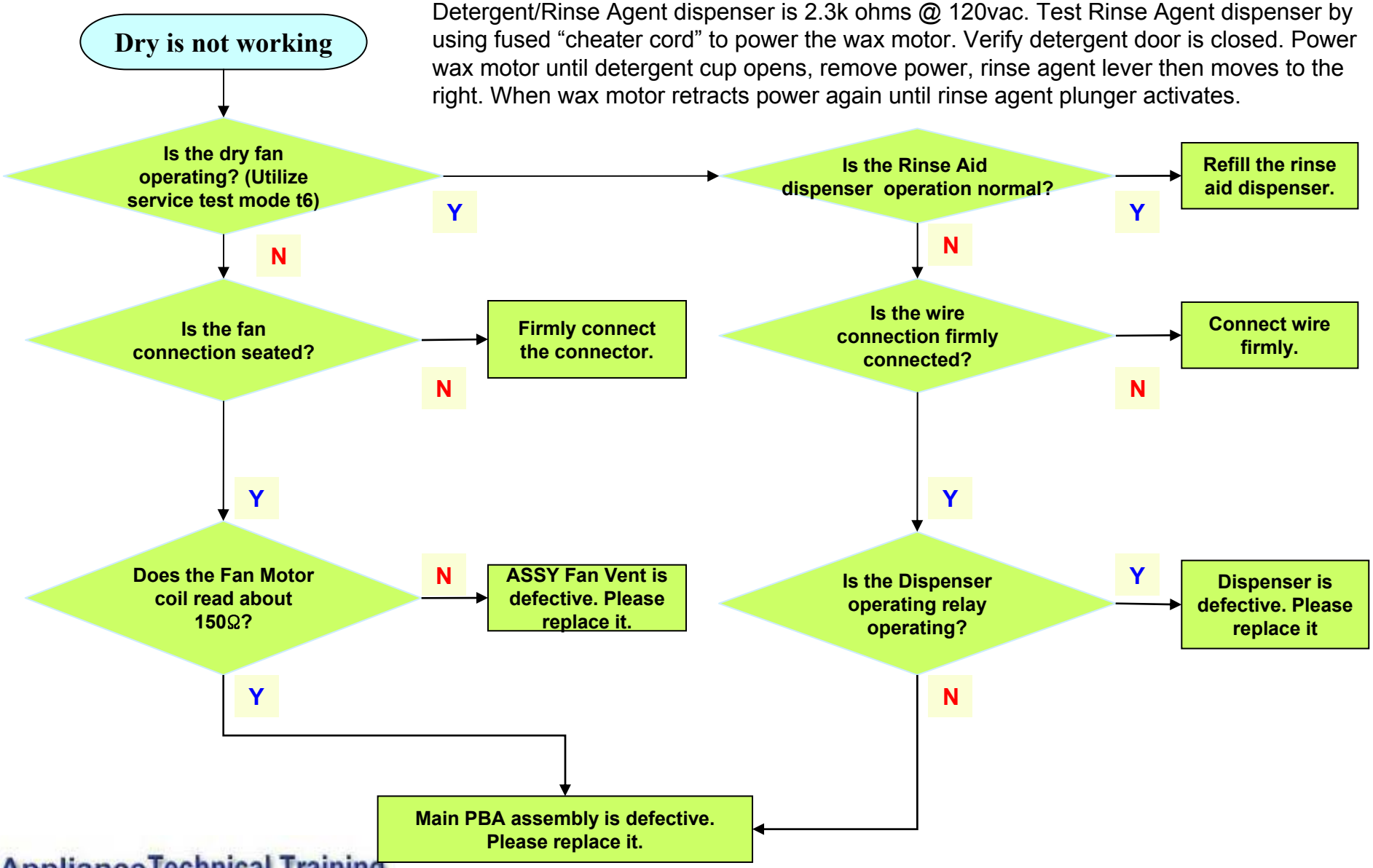

The drain is not working. (5E)
Y
Is the drain hose clear?
N
Clean the inside of the drain hose.
Y
Is the Low Level Sensor working normally? (Check service test mode t8 and check the float operation.)
N
Low Level Sensor is defective. Please replace it.
Y
Is the drain pump terminal normal?
N
Connect the drain pump terminal firmly.
Y
Does the drain motor read about 25Ω?
N
Drain pump is defective. Please replace it.
Y
Is the main relay working normally?
Refer to “Main relay is not working”.
N
Main relay is defective. Please replace it.
Y
Main PBA ASSY is defective. Please replace it.

No Water Fill Troubleshooting

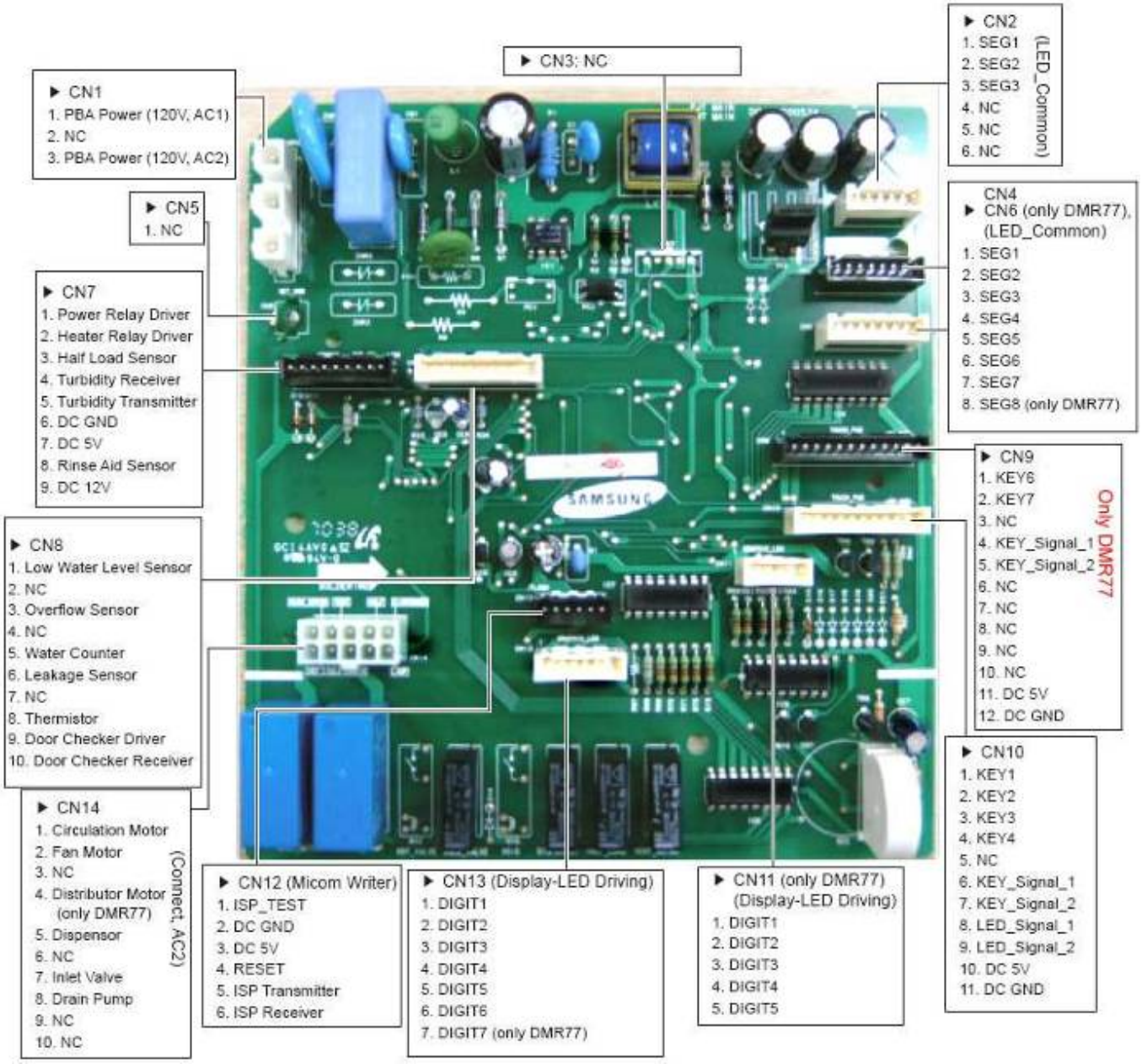

Water supply is not working.(4E)
Water supply is correct and on
Is the water valve connector seated properly?
N
Re-insert the water valve connector
Y
Does the water supply valve coil measure about 1.2K Ω?
N
Y
Is the water supply relay working normally?
N
PCB assembly is defective. Please replace it.
Y
Is the main relay working normally? Refer to "Main relay does not work".
N
Main relay is defective. Please replace it.
Does the valve open continuously?
N
Flow meter is defective. Please replace it.
Y
Does the water valve stay open for 5 minutes straight?
N
Water supply valve is defective. Please replace it.
Y
The water supply pressure is too low. Check household water supply and shutoff valve to D/W.

No Dry Operation Troubleshooting

Detergent/Rinse Agent dispenser is 2.3k ohms @ 120vac. Test Rinse Agent dispenser by using fused “cheater cord” to power the wax motor. Verify detergent door is closed. Power wax motor until detergent cup opens, remove power, rinse agent lever then moves to the right. When wax motor retracts power again until rinse agent plunger activates.



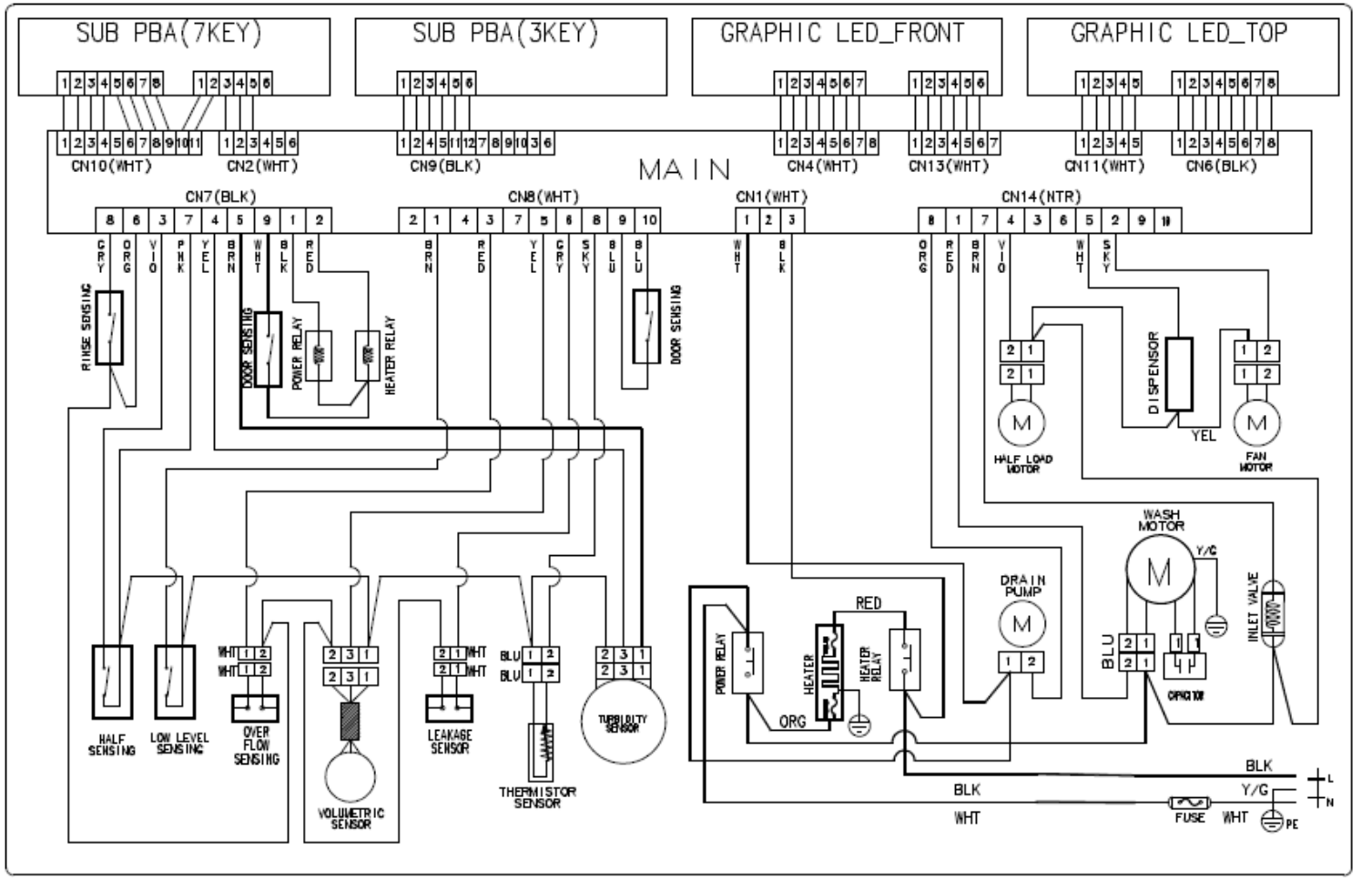
Main PCB Connector Layout



Wiring Diagram (DMR77)

Reference Information

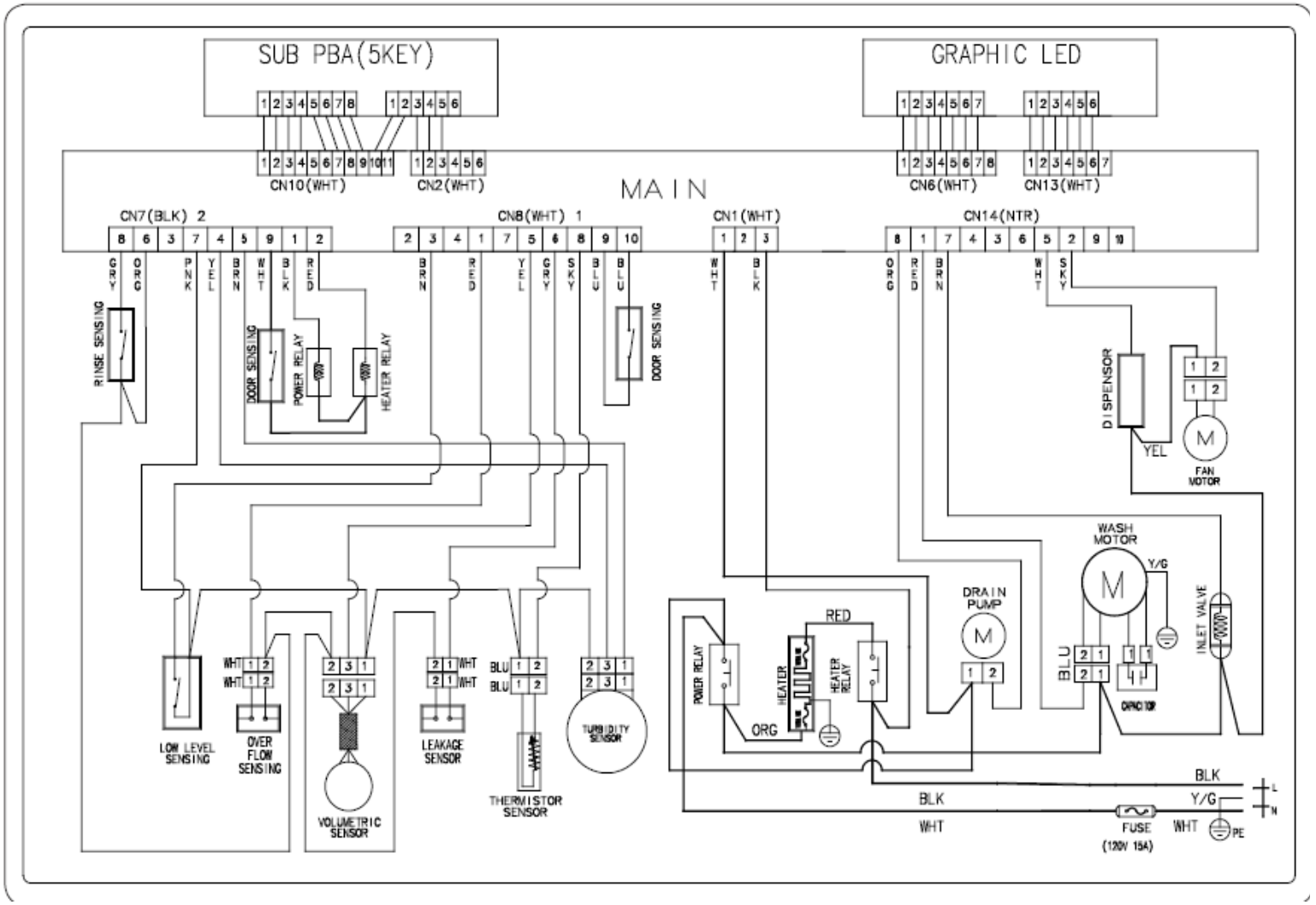
Abbreviated word	Meaning
GRY	GRAY
ORG	ORANGE
VIO	VIOLET
PNK	PINK
YEL	YELLOW
BRN	BROWN
WHT	WHITE
BLK	BLACK
RED	RED
SKY	SKY BLUE
BLU	BLUE
Y/G	YELLOW / GREEN
NTR	COLORLESS



Wiring Diagram (DMR57)

■ Reference Information

Abbreviated word	Meaning
GRY	GRAY
ORG	ORANGE
VIO	VIOLET
PNK	PINK
YEL	YELLOW
BRN	BROWN
WHT	WHITE
BLK	BLACK
RED	RED
SKY	SKY BLUE
BLU	BLUE
Y/G	YELLOW / GREEN
NTR	COLORLESS



Chapter 10

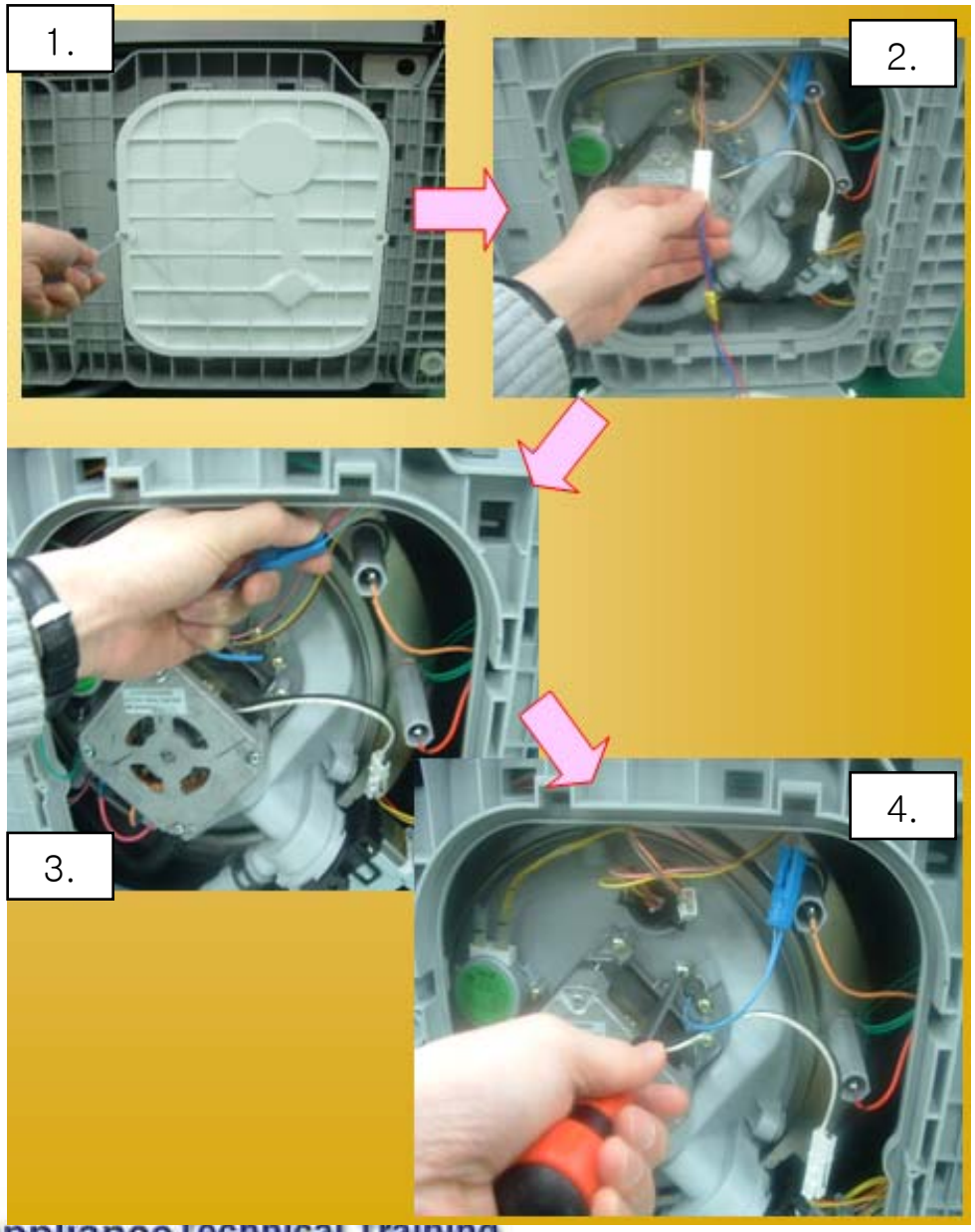
Dishwasher Disassembly

Disassembly -Preparation

Preparation for parts replacement

1. Take out the residual water inside the product.
   (Drain the water by operating the drain pump if possible)
2. Close the water supply valve.
3. Turn off the power. You must turn off the circuit breaker connected to the product.
4. Pull out the unit from under the counter and lay it on the floor. Be careful of the drain hose when pulling out the unit. There may be water still in the hose, drain pump and sump.

Thermistor Replacement



1) Lay the product down so that you can see the BASE, and unscrew the 2 screws securing the BASE and the SHUTTER.

2) Separate the terminal of Leakage Sensor terminal of the Shutter.

3) After checking the THERMISTOR location, unscrew 2 screws securing the CASE SUMP.

4) Disassemble the wire connected to the THERMISTOR.

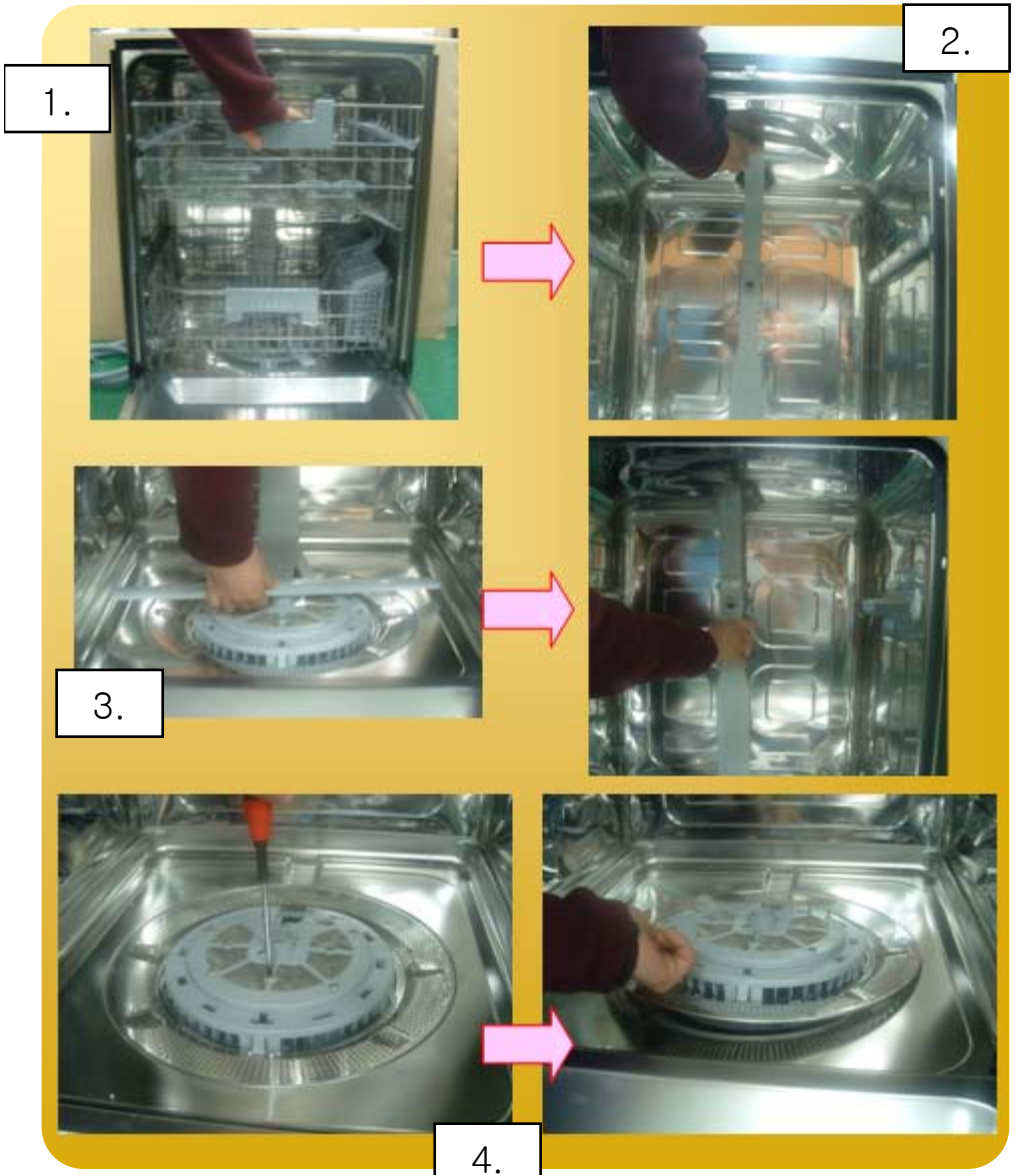
※ CHECK LIST

▶ Be careful of the residual water inside the unit

▶ The resistance of THERMISTOR at 77 °F should be 49Ω (Refer to table by temperature)

▶ The voltage between THERMISTOR connecting wires should be 0.2V~4.5V

Heater Replacement part 1



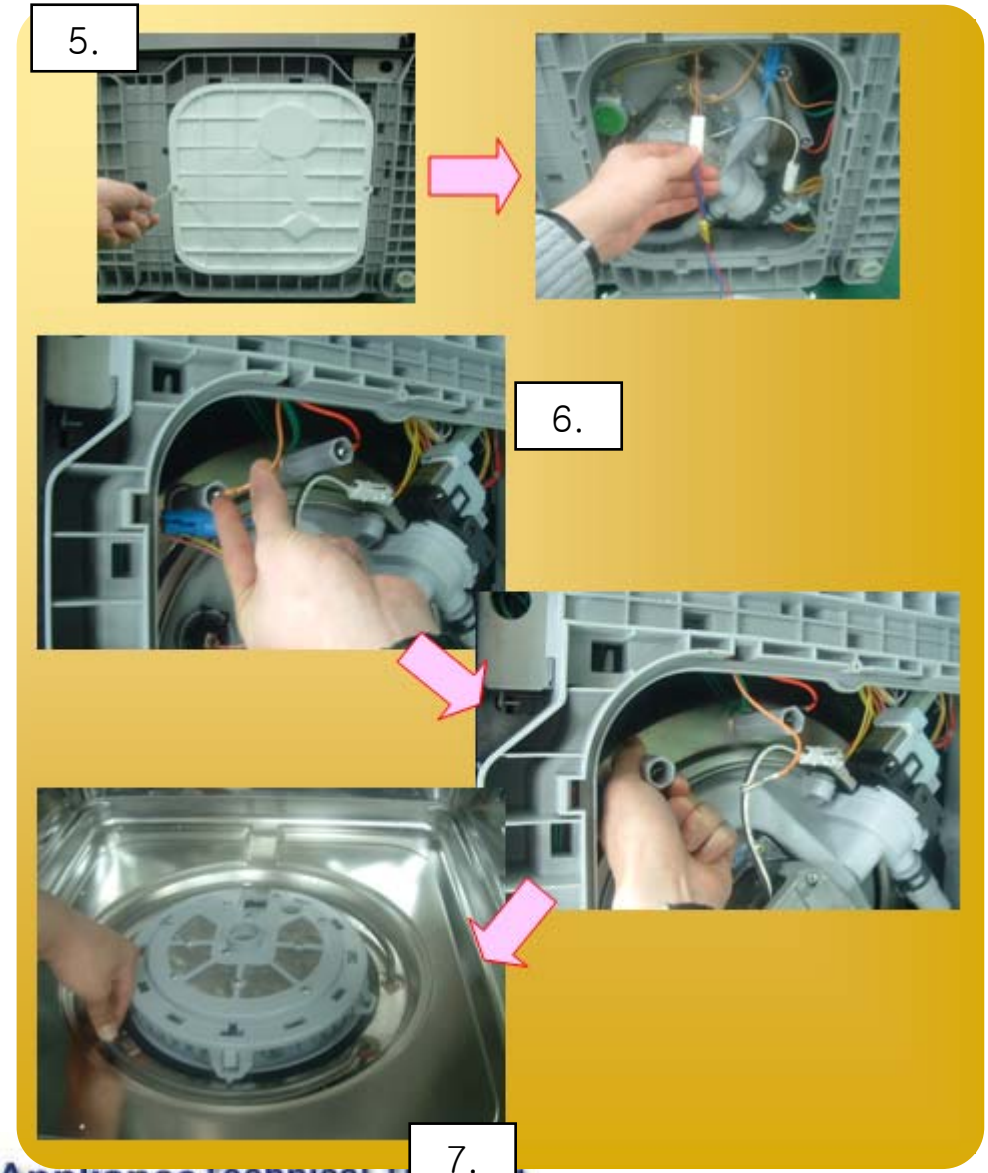
1) Open the door and separate the upper and lower rack from the dish washer.

2) Separate the nozzle bottom.

3) Separate the nozzle duct.

4) Disassemble the Sump assembly and separate the Cover Sump and Heater Cover to prevent damage.

Heater Replacement Part 2



5) Lay the product down, and unscrew the 2 screws securing the BASE and the Shutter. Separate the terminal of Leakage Sensor terminal of the Shutter.

6) After disassembling the terminal inserted to the Heater, turn the Holder Heater in CCW direction to disassemble it.

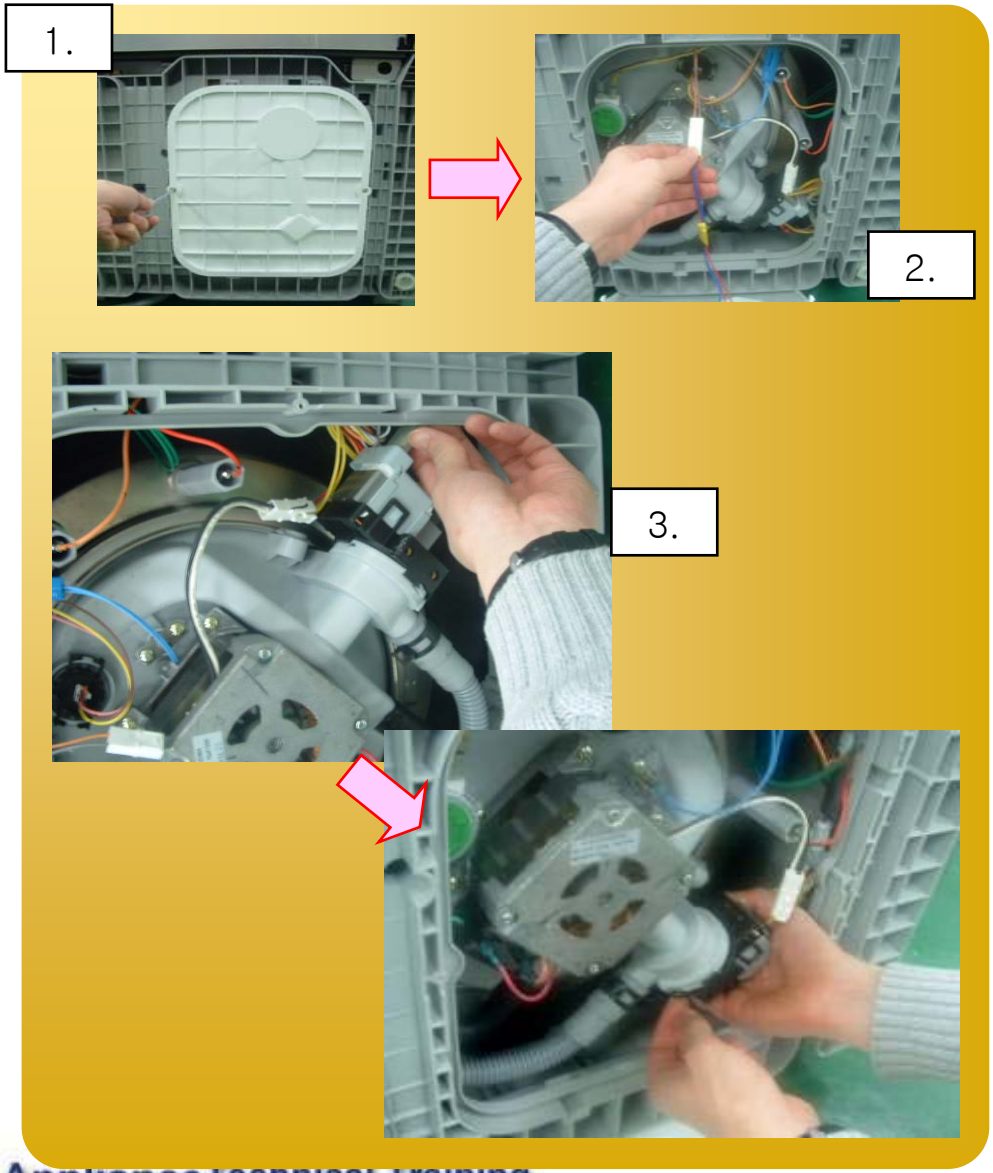
7) Set the product upright and open the door to pull out the heater. Be careful of the interference with the Heater Bracket.

※ CHECK LIST

▶ Measure the resistance of the heater ends: 12Ω (Measure after removing the connecting terminal)

▶ Check the relay connecting terminal and check the operating signal

Drain Pump Disassembly



1) Lay the product down, and unscrew the 2 screws securing the BASE and the Shutter. Separate the terminal of Leakage Sensor terminal of the Shutter.

2) Separate the terminals (2 units) of the PUMP DRAIN.

3) Turn the PUMP DRAIN in CCW direction to pull it out.

※ CHECK LIST

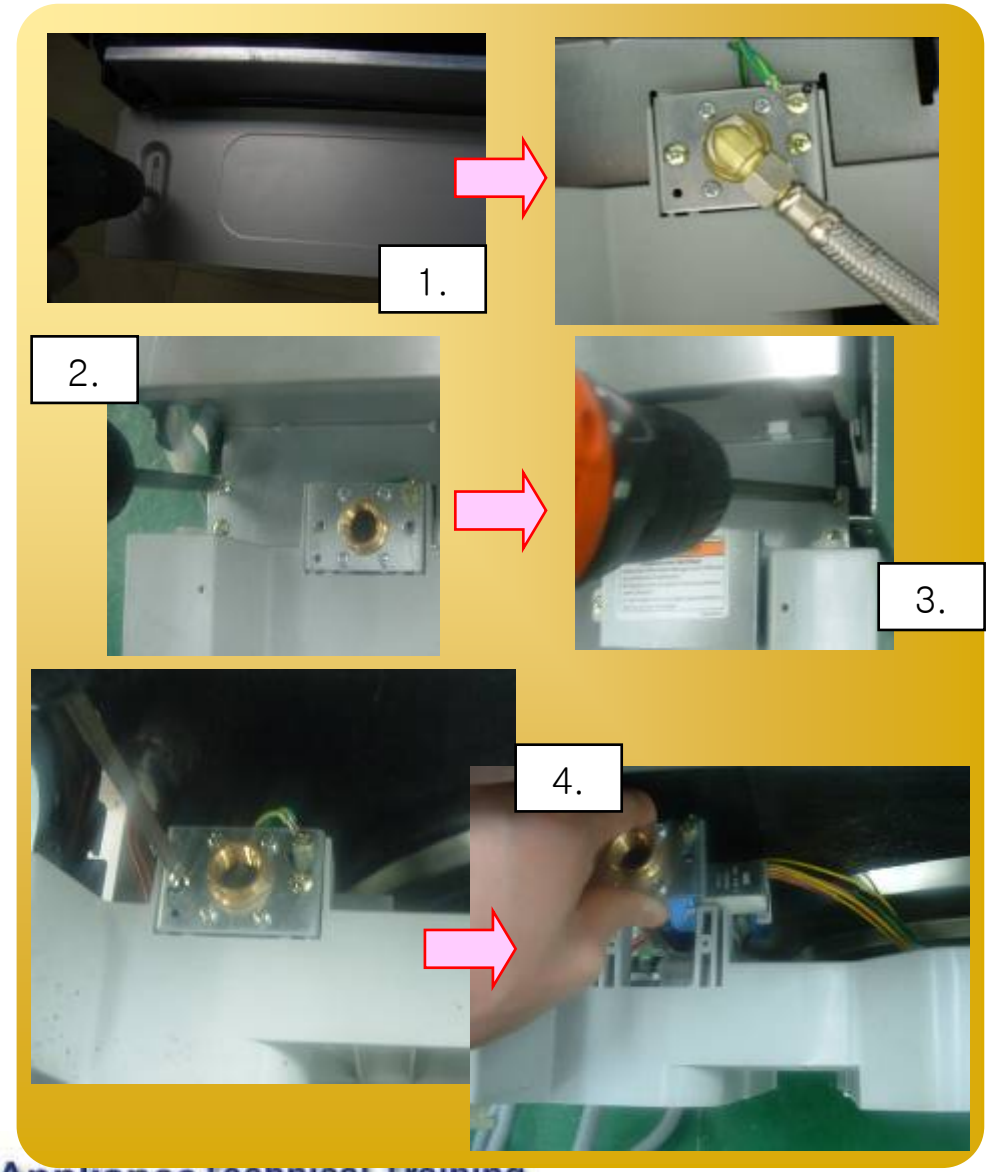
▶ Be careful of the residual water inside the unit from prior wash

▶ Check the drain motor coil resistance (25Ω): Measure product condition

▶ Check the voltage between the drain motor terminals of 120V

▶ PCB: Check CN1 – CN14 (120V)

Water Valve Disassembly



1) Disassemble the front lower Cover. Check before disassembly that the water supply valve connected to the water supply line is turned off.

2) Disassemble the front lower Frame .

3) After separating the water supply hose connected to the water supply valve, disassemble the water supply valve. (2 screws)

4) Hold the water supply valve and pull it up to separate the clamp.

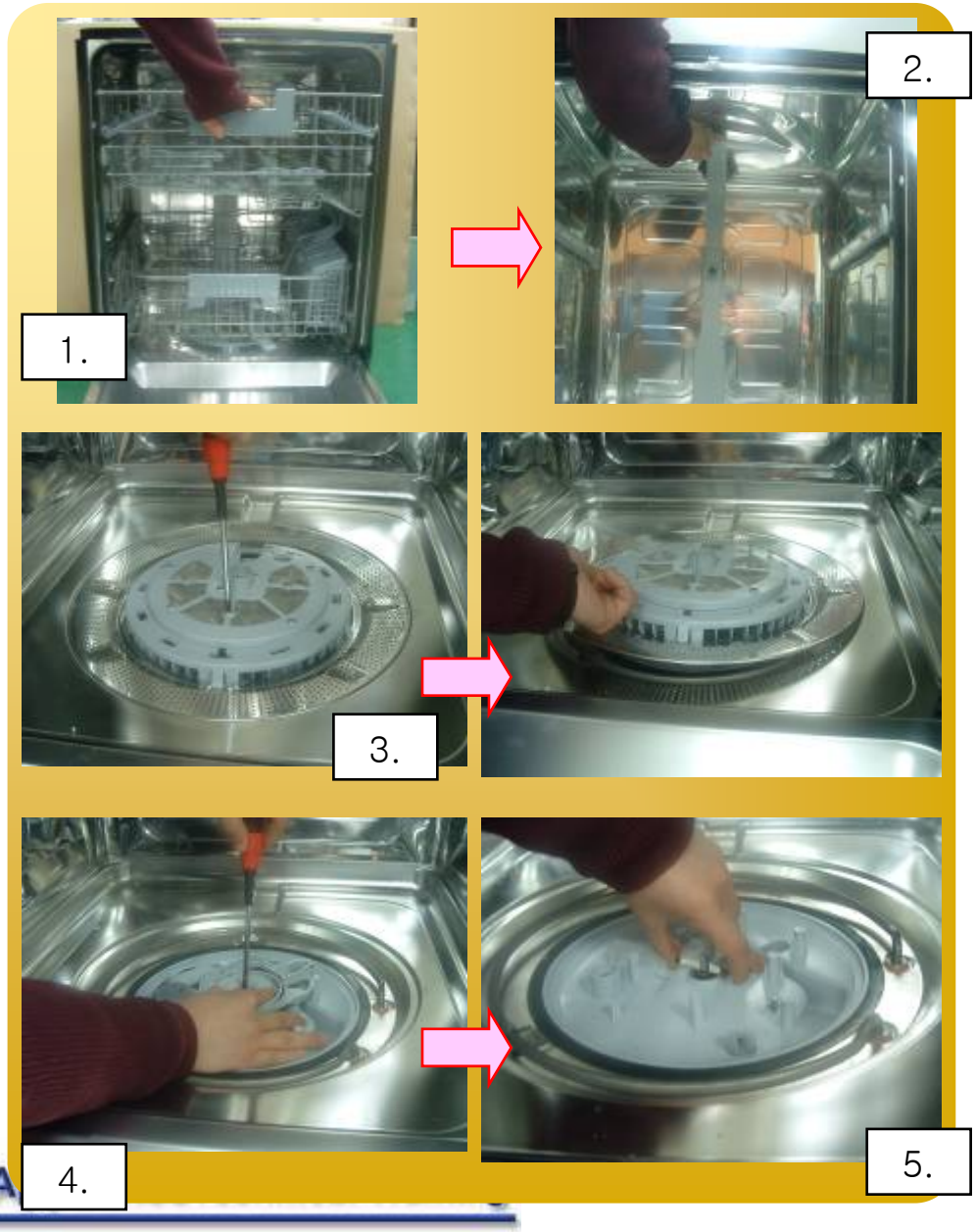
※ Check List

▶ The Solenoid coil should read 1.2K Ω

▶ Check the voltage at the water supply valve terminals of 120V.

▶ Check PCB RELAY: Check CN1 – CN14 120VAC

Circulation Pump Disassembly Part 1



1) Open the door and pull out the Upper and Lower Basket.

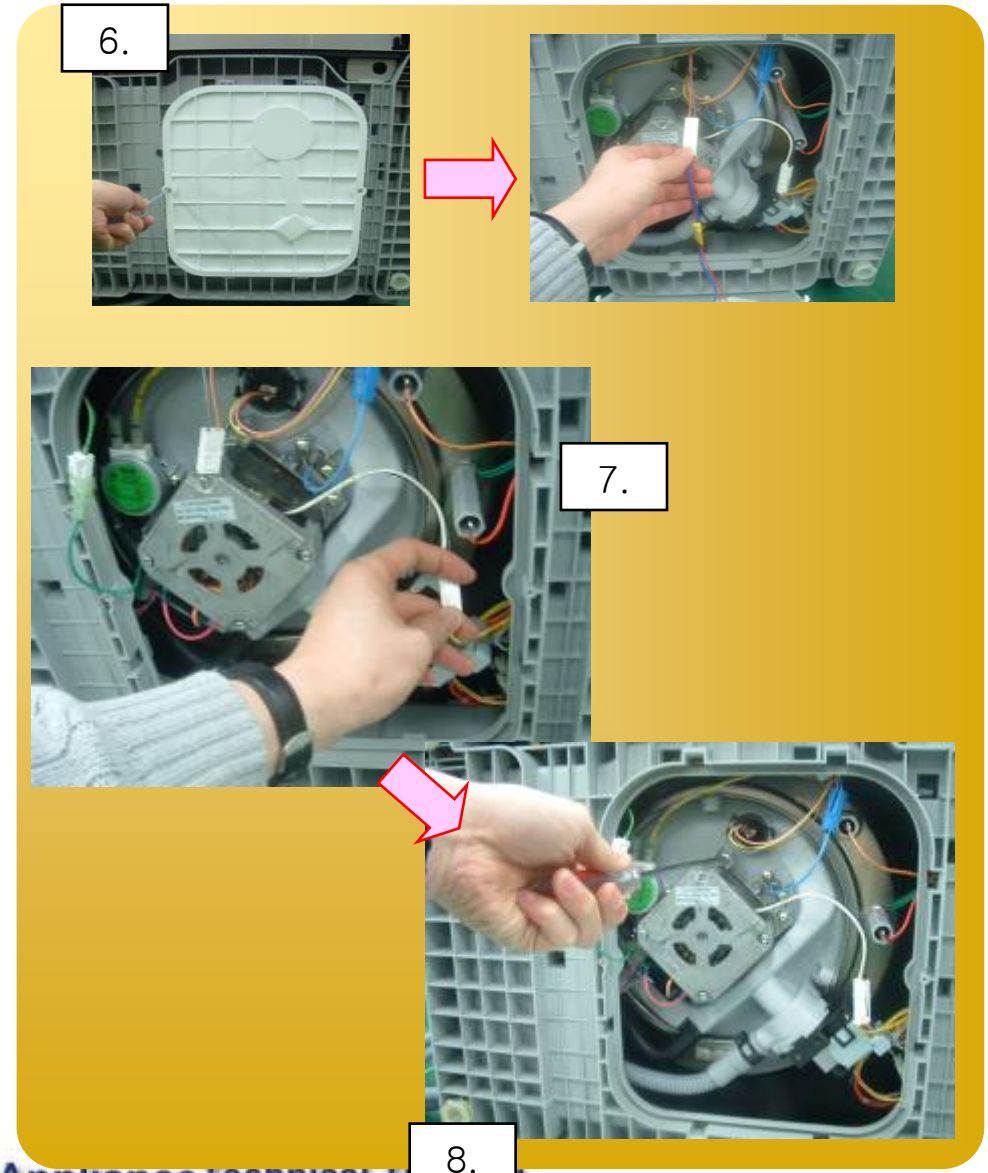
2) Separate the Top, Bottom and Duct Nozzle.

3) Disassemble the Sump assembly and separate the Sump & Heater covers.

4) Disassemble the Circulation Impeller and separate the Case Scroll.

5) Separate the Disposer Cutter.

Circulation Pump Disassembly Part 2



6) After laying the product down and disassembling the Shutter, separate the Leakage Sensor terminal assembled on the Shutter.

7) Separate the terminal of Circulation Motor.

8) Disassemble the Circulation Motor and separate it from the Sump assembly.

※ Check List

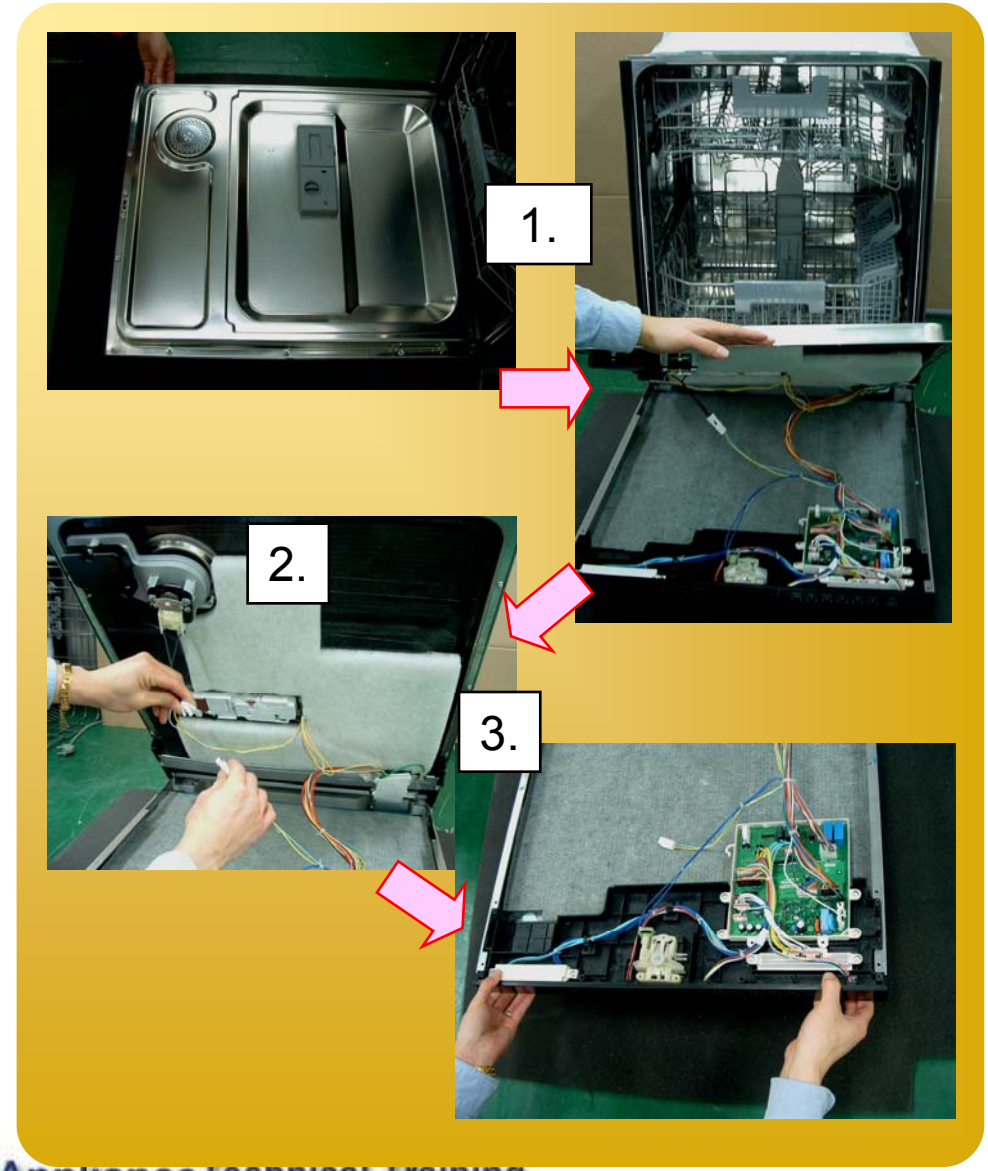
▶ Be careful of the residual water inside the unit from prior wash

▶ Check the voltage at the connectors: 120VAC

▶ Check coil resistance: 16.5Ω (Measure after removing connectors)

▶ PCB : Check CN1 -CN14 (120VAC)

Control Panel Disassembly Part 1



1) Open the door and unscrew the Front Frame, Front Tub and Panel Control. (12 screws)
[Caution]
- Always set a mat on the floor so that the front of the Frame does not get damaged during the work.
- When you remove all the screws, the Front Tub may spring closed, be careful.

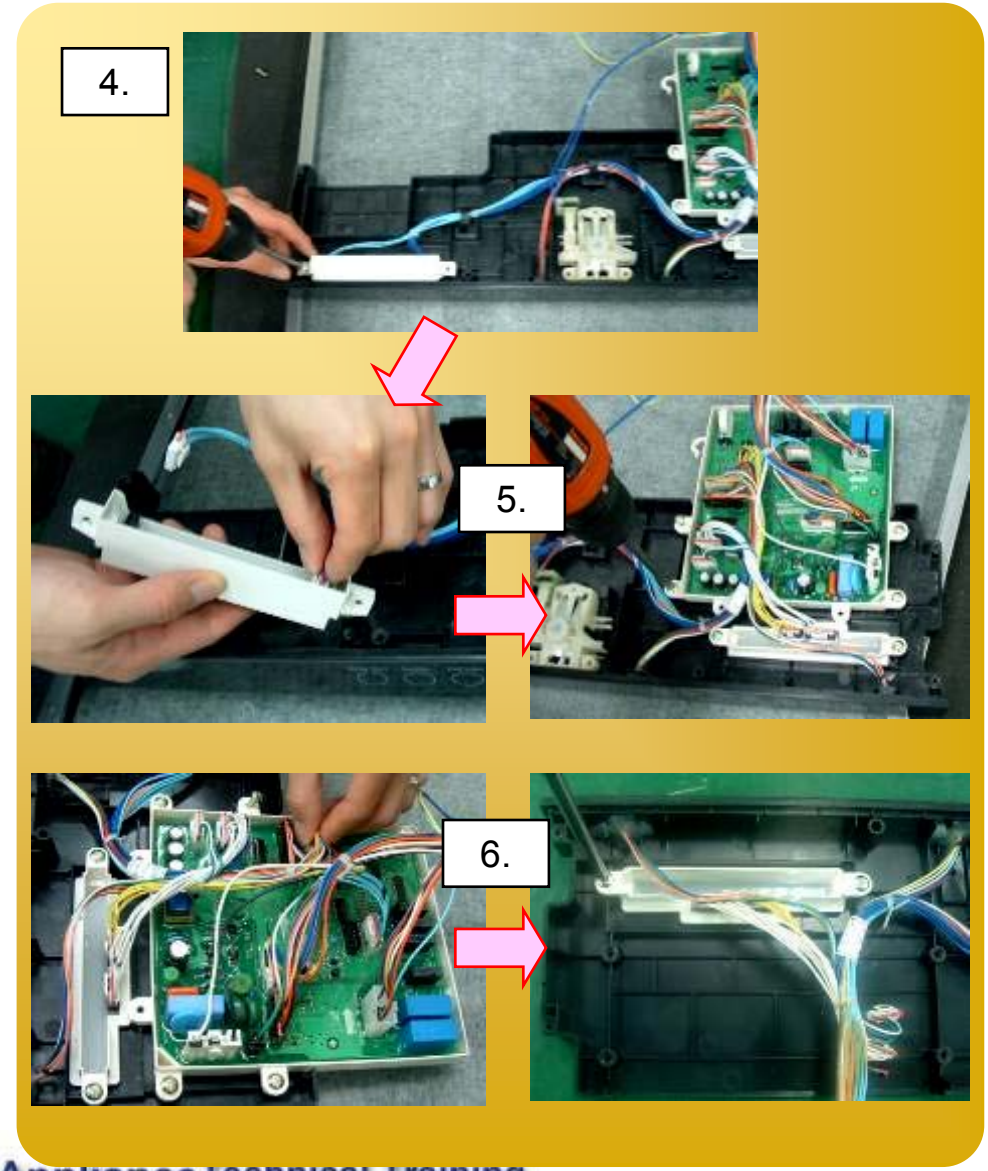
2) After separating the Fan Motor terminal, put the Front Frame assembly down on the floor.

3) Pull out the terminal of the Door Switch and then you can replace the Door Switch if needed.
[Proceed to 4) when disassembling Display LED, Display LED Front or PCB assembly.]

※ Check List

▶ Check the voltage between Door S/W ends
When open: ~5VDC
When closed: 1VDC or below

Control Panel Disassembly Part 2



* Display LED removal

4) Disassemble the Display LED by removing the 2 screws that hold it and disconnect the wiring harness.
[Caution]
Be careful not to reuse the O-ring seal when reassembling the unit.

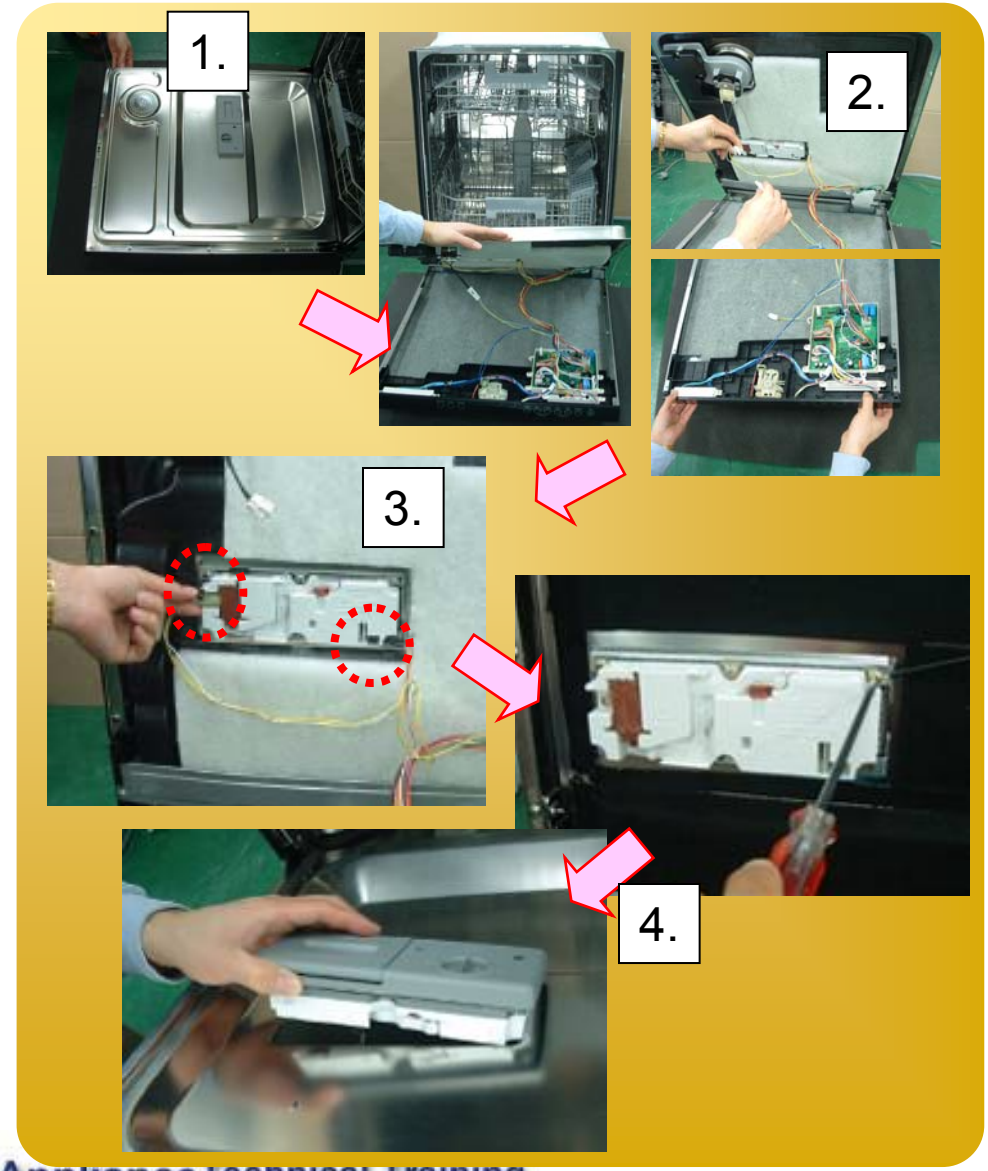
* PCB removal

5) Remove the 4 screws that hold the PCB assembly in place and disconnect the wiring harness of PCB.
[Caution]
- When separating the connectors, always turn the power off before working.

* Front Display LED removal

6) Remove the 2 screws that hold the LED Display in place and disconnect the wiring harness of the LED Display.

Dispenser Replacement



1) Open the door and unscrew the screws of Front Frame and Front Tub (12 screws)
[Caution]
- When you unscrew all the screws, the Front Tub may spring closed, be careful.

2) After separating the Fan Motor terminal, put the Front Frame assembly down on the floor.

3) Disassemble the terminal connected to the DISPENSER. You must disassemble both the left and right terminals.

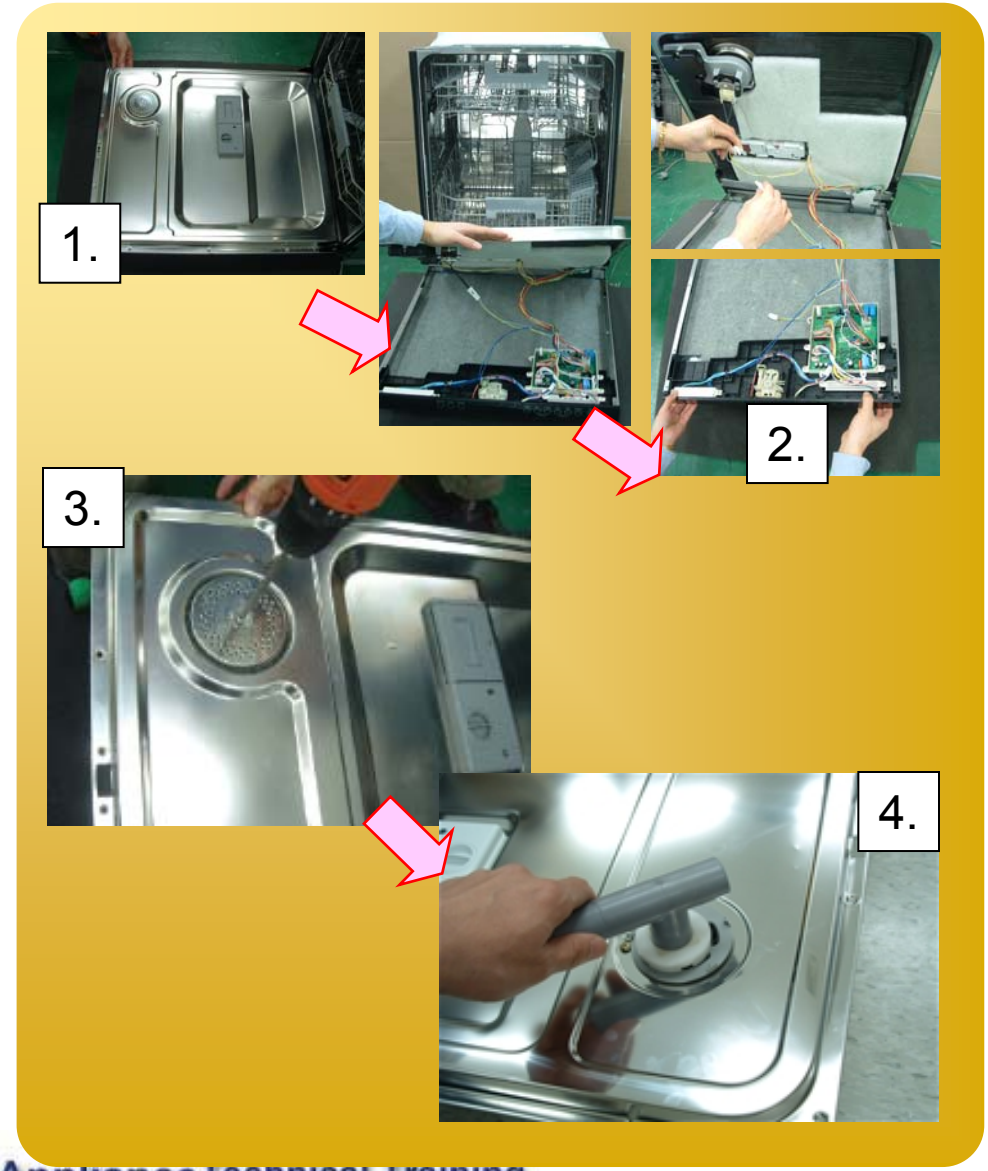
4) Unscrew 6 screws securing the DISPENSER.
It is fixed to the tub front with a hook. Use a flat screwdriver to remove it from the tub front.

※ Check List

▶ Because there is a risk of leakage after replacement, check whether it is sealed properly.

▶ The voltage on the terminals should measure 120VAC or a resistance of ~2.3Ω

Fan Vent Disassembly Part 1



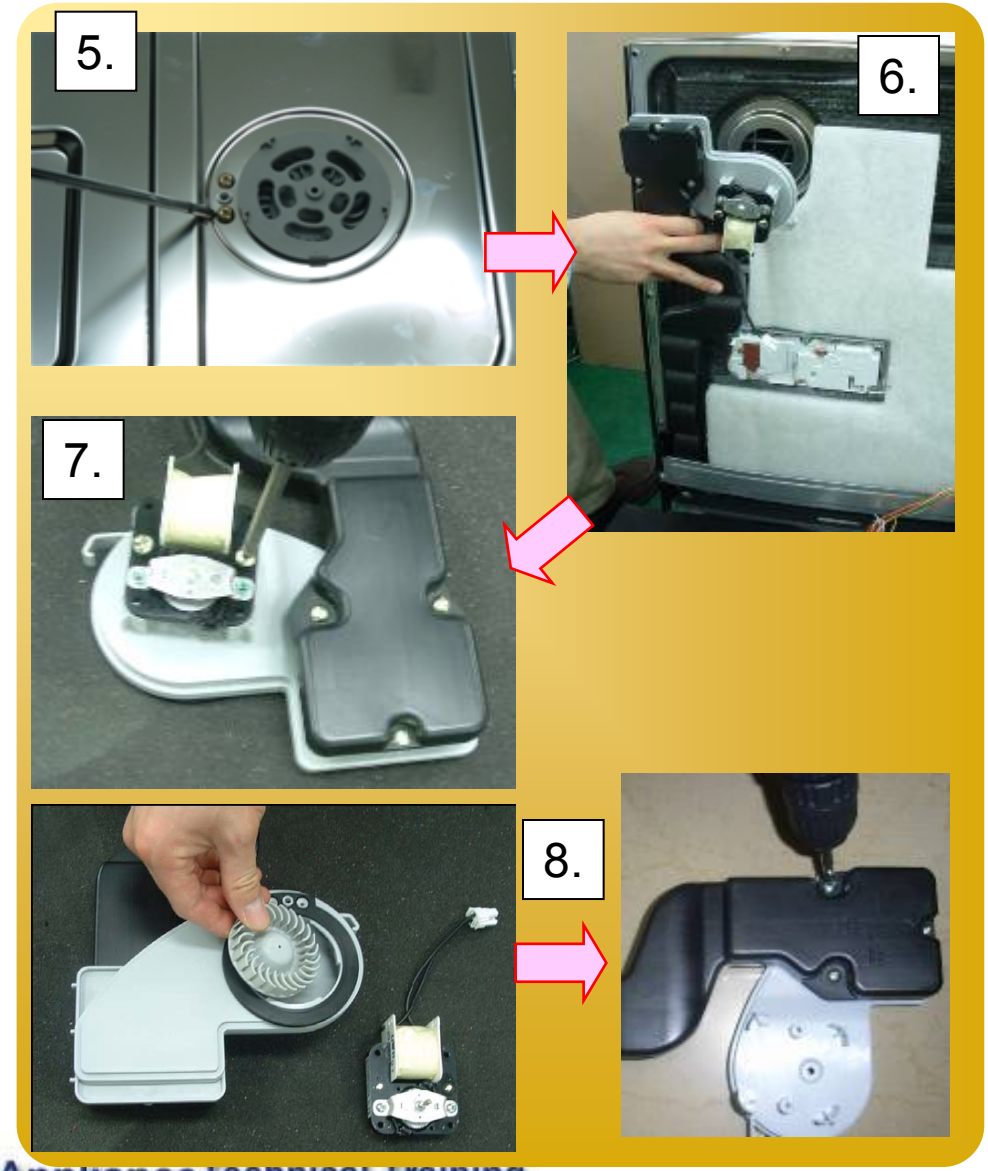
1. Open the door and unscrew the screws of Front Frame and Front Tub (12 screws)
   [Caution]
   - When you unscrew all the screws, the Front Tub can close up injuring the worker.

2. After separating the Fan Motor terminal, put the Front Frame assembly down on the floor.

3. Disassemble the Bracket Cover Fan. (1 Screw)

4. Disassemble the Cover Fan by rotating it counterclockwise with a jig or long nose pliers.

Fan Vent Disassembly Part 2



5) Remove the 2 screws holding the cover fan in place.

6) Hold and remove both the case vent assy and the duct condenser assy.
[Caution]
- Be careful while removing them as the duct condenser is touching the bracket door link.

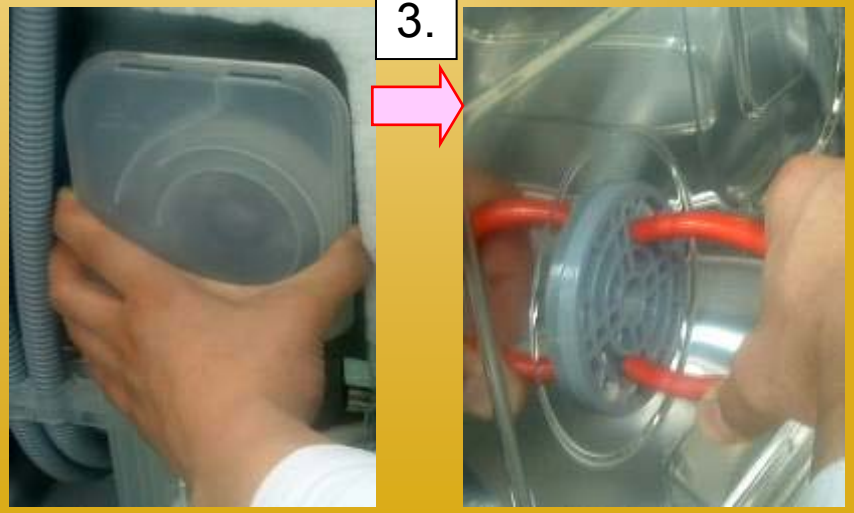
7) Remove the 2 screws holding the fan motor from the case vent assy. And carefully pull out the fan motor.

8) Remove the duct condenser from the case vent assy (3 screws).

※ Check List

- ▶ Because there is a risk of leakage after replacement, check whether it is sealed properly.
- ▶ Check the voltage of Fan Vent ends: 120V
- ▶ PCB RELAY : Check CN1 ~ CN14 (120V)
- ▶ Measure coil resistance of both ends: 150Ω

Case Sensor Disassembly Part 1



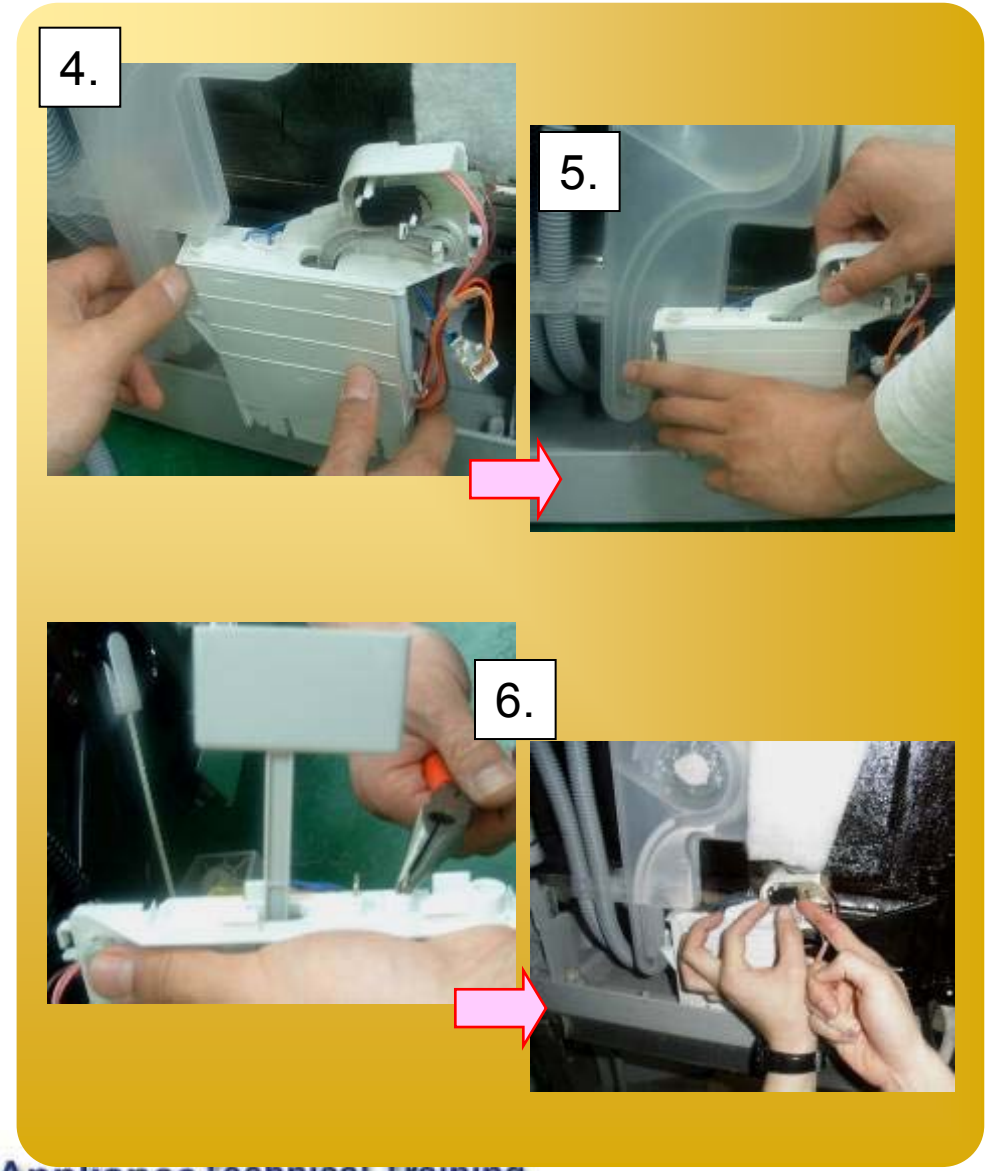
1) Remove the 2 screws connecting the Left Frame.
- When you separate the Left Frame, you can check the Case Sensor, and replace the Micro S/W on the Cover Sensor part.

2) Separate the Drain Hose from the Bracket Hose Drain.

3) Separate the Case Brake and Cover Brake.
[Caution]
- When disassembling, you must use the jig for the Cover Brake. If you have no jig, you can use a pair of long nose pliers.

※ Check List
▶ The voltage at the Micro Switch terminals should measure 4.5~5.25V after drain completion
▶ Measuring the continuity of the Micro Switch should measure:
- When pulling the lever up: Short
- When pulling the lever down: Open

Case Sensor Disassembly Part 2



4) Separate the Case Sensor from the Case Brake.
[Caution]
- Be careful not to break the Hook.

5) Separate the Case Sensor and Cover Sensor.
[Caution]
- Be careful not to break the Hook.

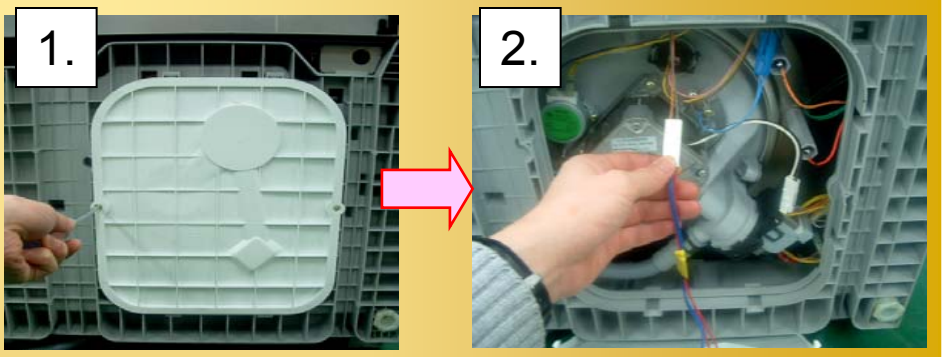
6) Separate the Pole Sensor (2 units) from the Cover Sensor. Separate the terminal of the Pole Sensor.

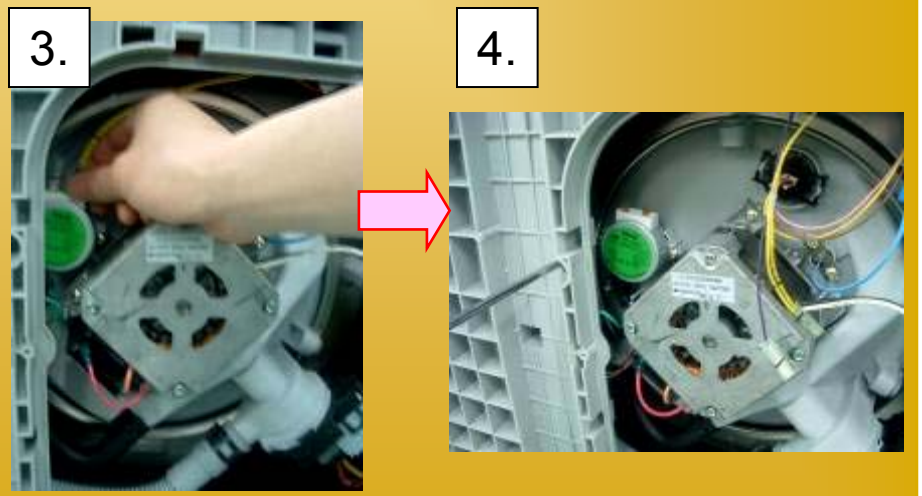
※ Check List

▶ Measure the voltage of Micro S/W ends:
It is normal when the voltage is 0.5V or below after water supply is completed and 4.5~5.25V after water drain is completed.

▶ Measure the Micro S/W product:
Short when the lever is pulled up and open when pulled down

Distributor Disassembly





1) Place the dishwasher on its back so that you can see the base. Remove the two (2) screws that hold the base and the shutter in place.

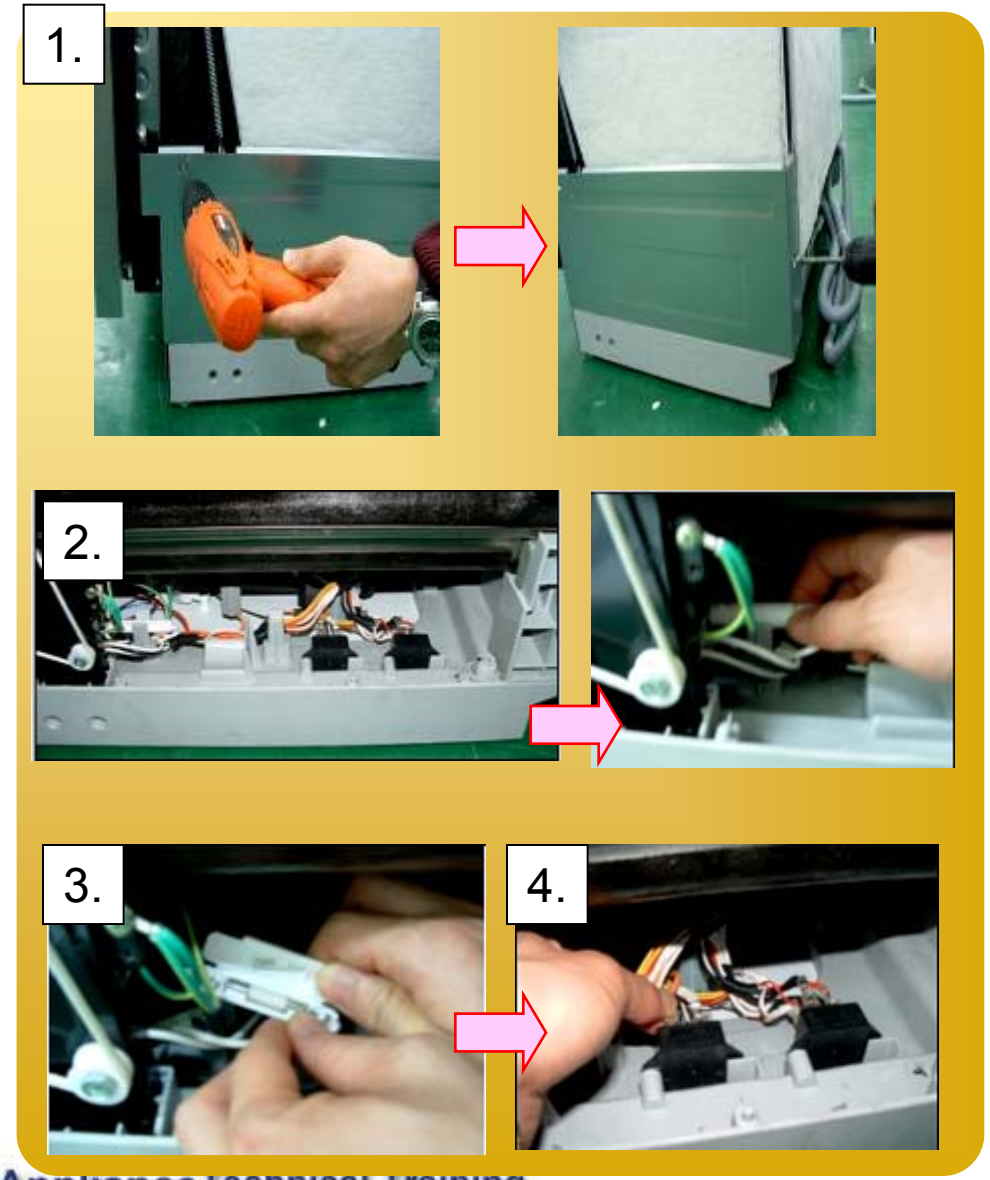
2) Remove the leakage sensor connector (white) inside the shutter.

3) Remove the two (2) distributor motor connectors.

4) Remove the two (2) screws that hold the distributor motor in place.
(You can remove one of the two screws through the hole in the base.)
Pull the distributor motor out.

※ Check List
- ▶ Check PCB: Check CN1-CN14 voltage: (120VAC)
- ▶ Check the voltage of Synchronous Motor: (120VAC)
- ▶ Check the resistance of Synchronous Motor: (2.6kΩ)

Relay and Fuse Replacement



1) Remove the 2 screws connecting the Right Frame.

2) When you separate the Right Frame, you can check the Fuse & Relay.

3) Pull out Fuse case that be fixed on hook of Base.

4) Open the Fuse case.
Check the fuse. & It can replacement.

5) Separate the terminal of Relay.
Unscrew the screws of relay using short-body screwdriver.

※ Check List

▶ When reconnecting the relay terminals after check or replacement, you must be careful not to switch the connectors to the wrong relay.

Chapter 11

Dishwasher Installation

For additional installation details see the accompanying 2008 Installation DVD

Dishwasher Installation

INSTALLATION REQUIREMENTS

POWER REQUIREMENTS

- A 120 Volt 60 Hz 15 AMP fuse or circuit breaker
- An individual branch circuit serving only your dishwasher

GROUNDING

For a permanently connected appliance:
This appliance must be connected to a grounded metal, permanent wiring system, or an equipment-grounding conductor must be run with the circuit conductors and then connected to the equipment-grounding terminal or lead on the appliance.

WATER SUPPLY

The dishwasher will fill properly when your water pressure is 20~120 PSI (140~830 kPa). Water pressure less than 20 PSI (140 kPa) may cause water supply valve failure, not allowing the water supply valve to shut off completely. Or, it may take the dishwasher longer to fill than what the controls allow, resulting in your dishwasher turning off. You can reduce the risk of leaks and water damage by:

- Making water faucets easily accessible.
- Turning off faucets when the dishwasher is not in use.
- Periodically checking for leaks at water supply line fittings.

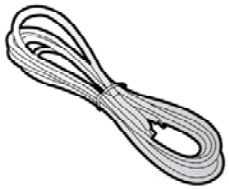
Before using the dishwasher for the first time, check all connections at the water supply valve and faucets for leaks.

FLOORING

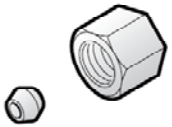
For best performance, your dishwasher must be installed on a solidly constructed floor. Never install your dishwasher on a platform or poorly supported structure.

Required Parts Not Provided

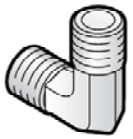
Water supply line



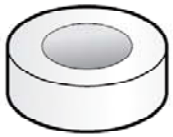
Power cable



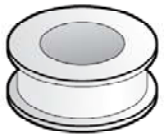
Tube fittings



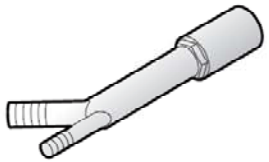
3/8” 90° Elbow



Electrical tape & Standard duct tape

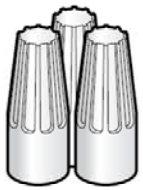


Teflon® tape or sealing compound



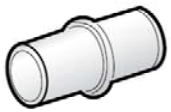
Air gap

Hose clamp



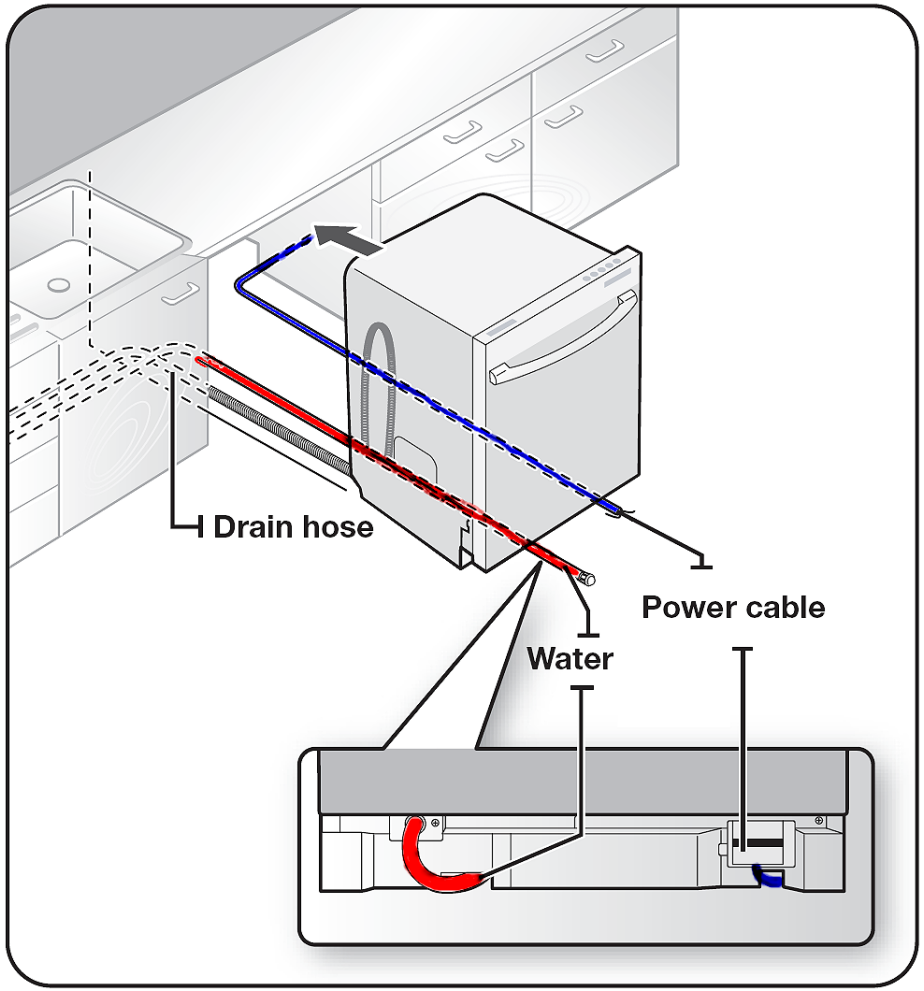
Twist on wire connector

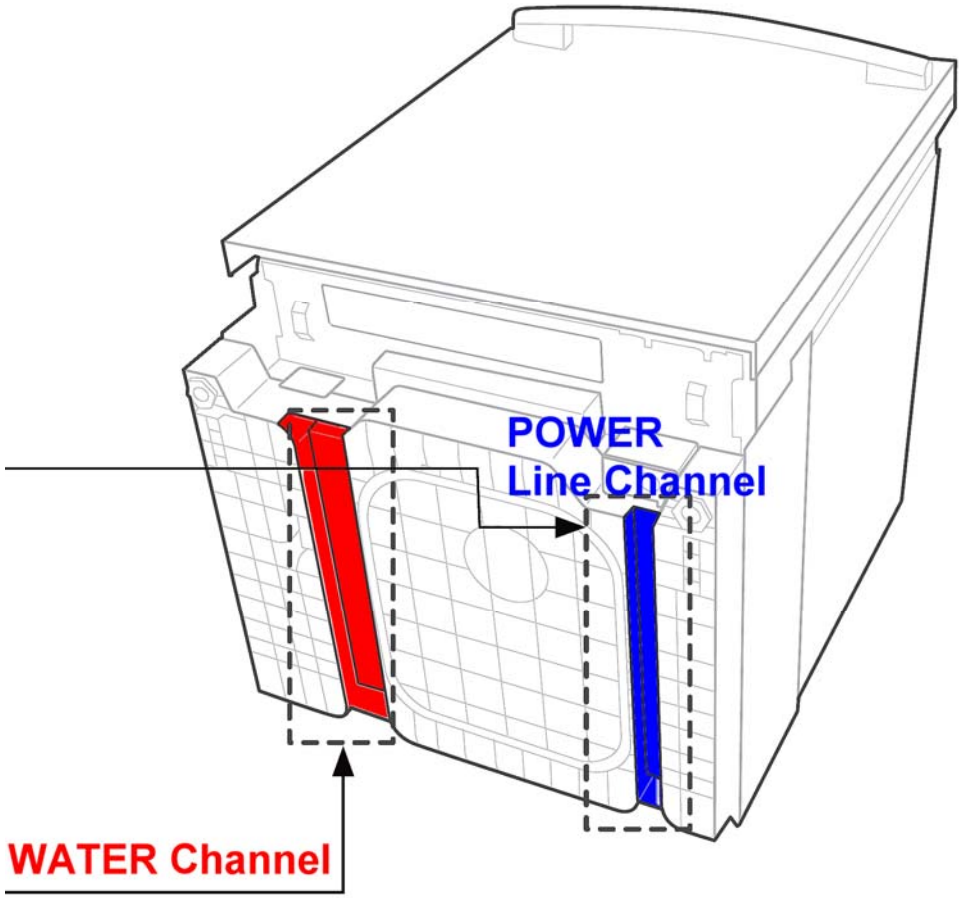
Strain relief



Rubber connector

Water and Power Line Routing





When sliding the dishwasher into position under the counter, make sure the water and power lines are in the channels provided for them and are not binding or pinched anywhere.

Chapter 12

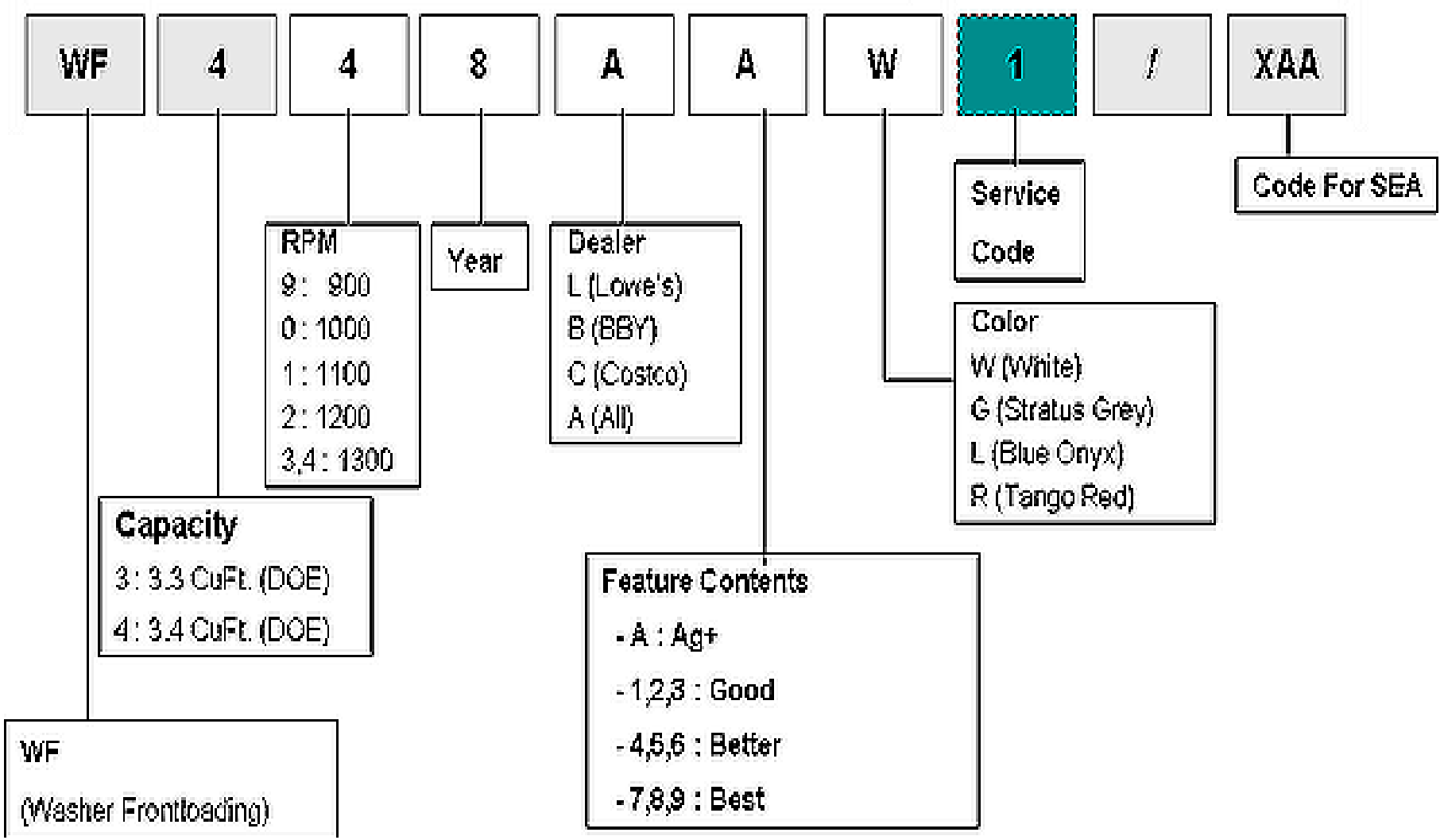
Front Load Washer/Dryer
Laundry Feature Information

WF448 Front Load Washer

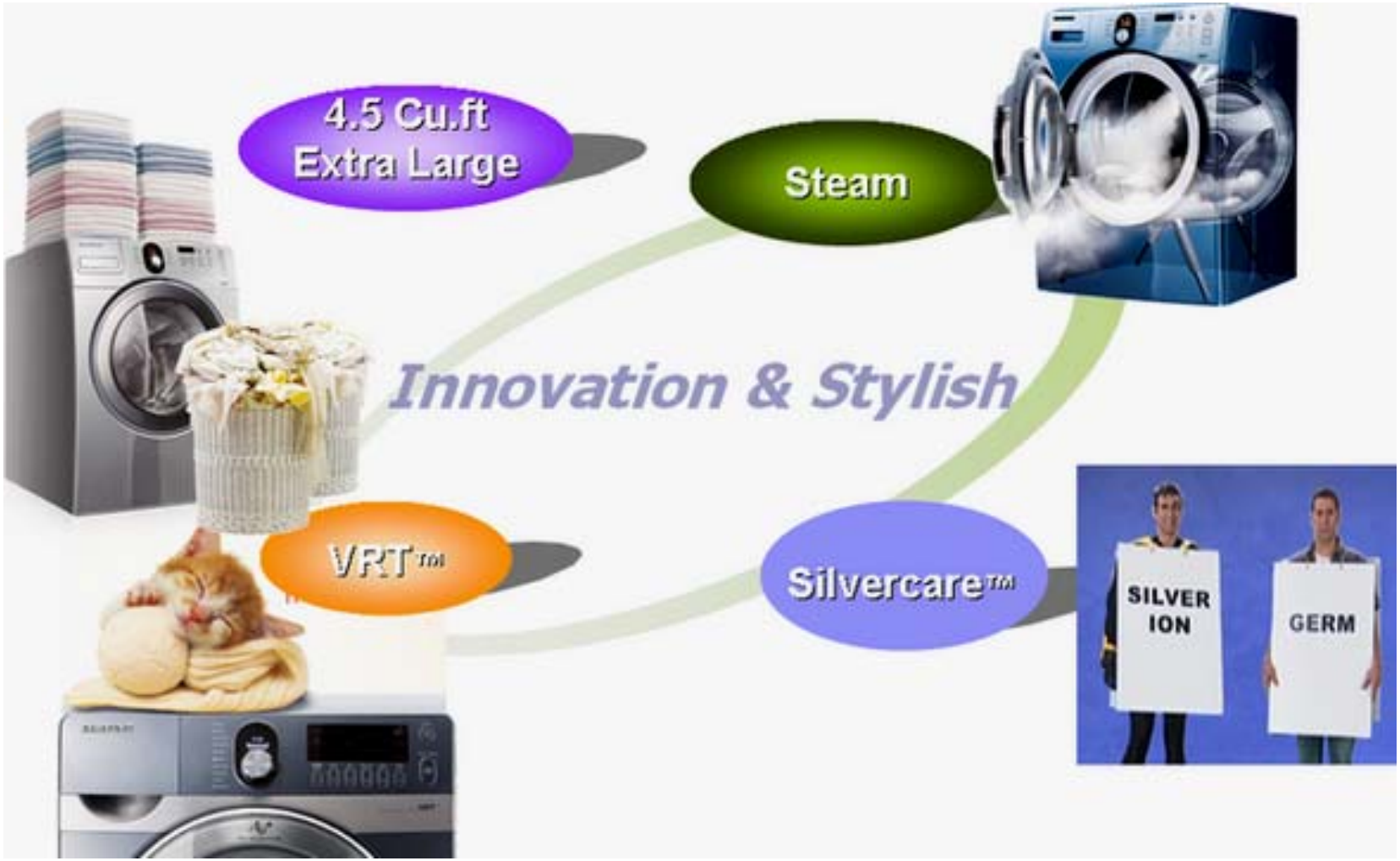
Main Features

- **Large Capacity (4.5 Cu. Ft.)**
- **Vibration Reduction Technology**
- **Steam Wash/Steam Dry (VRT team™)**
- **SilverCare™ Technology**
- **Energy-Efficient : MEF 2.7**

Model Number Nomenclature



New Product Features



2008 - 2007 Model Comparison

Project Name	PURPLE	FRONTIER 2
Model Name	WF448AAW WF448AAP	WF337AAW WF328AAG
Image		
Feature	- Steam Wash/Steam Dry (VRT Steam™) - Extra-Large Capacity - Vibration Reduction Technology - Stylish design : Center jog - Energy-Efficient : MEF over 2.6 - Diamond drum - Ag+ Sanitization - DD motor - LCD Display	- Sivercare Sanitization - Extra Large Capacity - High Efficiency Energy & Water Saving - Direct Drive Inverter Motor - Woolmark Certified™
Capacity	4.5 cu.ft	3.8 cu.ft

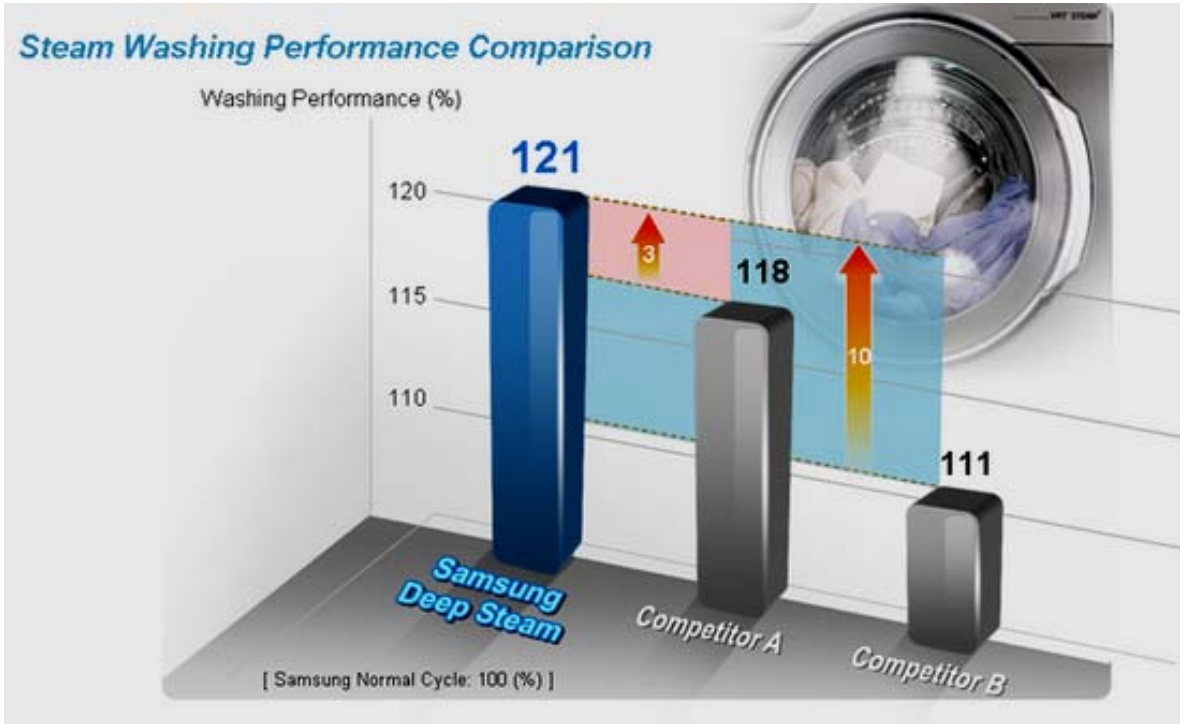
Vibration Reduction Technology

VRT or Vibration Reduction Technology is a simple but effective way of counter balancing the load inside the wash drum. The steel balls located in the track front and rear of the drum will find their balanced position based on the weight of the wash load.

WF448 Steam Function

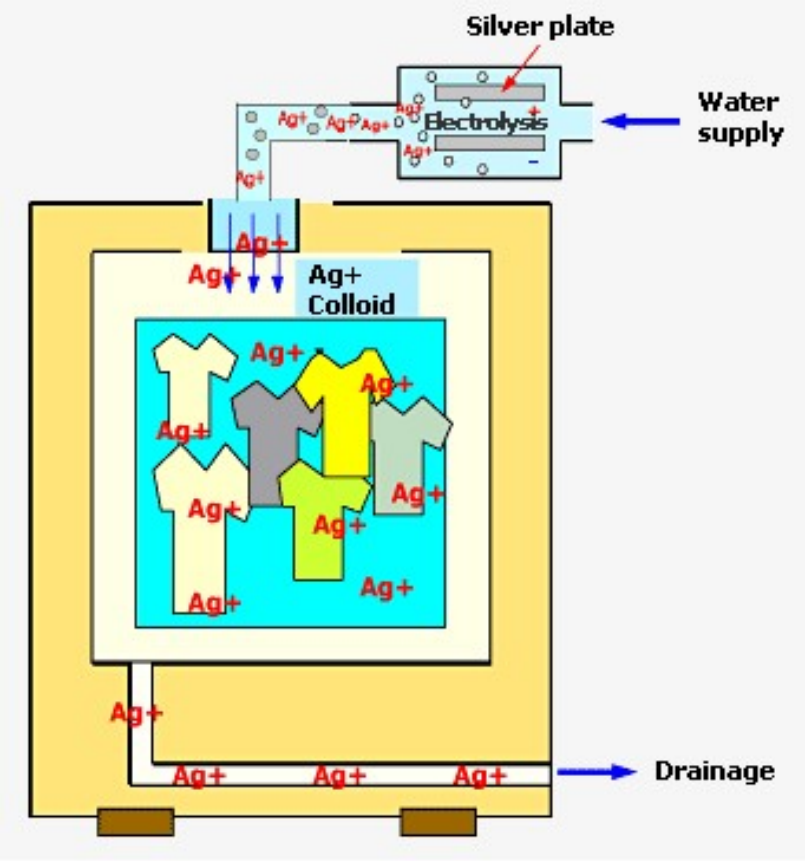
Soaking stains before washing by pre-programming the washing cycle with steam, heavily stained clothes are easily cleaned. You don't waste extra time on washing clothes or damaging clothes from frequent washing, but get the same clean result.

Steam Washing Performance



Deep steam - For heavily soiled, colorfast garments. This cycle improves stain removal using hot washing temperature and steam.

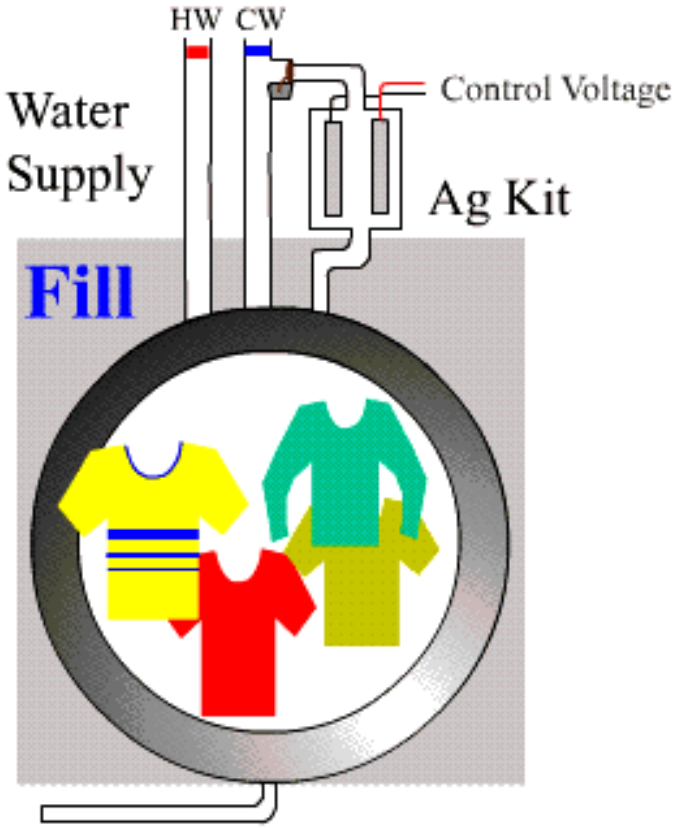
SilverCare™



Harnesses pure silver's sanitizing power, Nano science, and the state-of-the-art technological competency of SAMSUNG.
Two plates of 99.9% pure silver are converted into 4 million nano-sized particles through electrolysis and penetrate into the laundry blended with water.
Even in cold water, silver nano-sized particles sanitize and kill 99.99% of odor-causing bacteria.
Furthermore, this process sanitizes not only clothes but also the tub, thereby achieving a perfect 'Superior Clean' system.

Washing garments with SilverCareTM can save about 92% of energy compared to hot water sanitization.
Also, SilverCareTM Technology prevents damage to delicate clothes compared to sanitizing in hot water.

Silver Care Theory of Operation



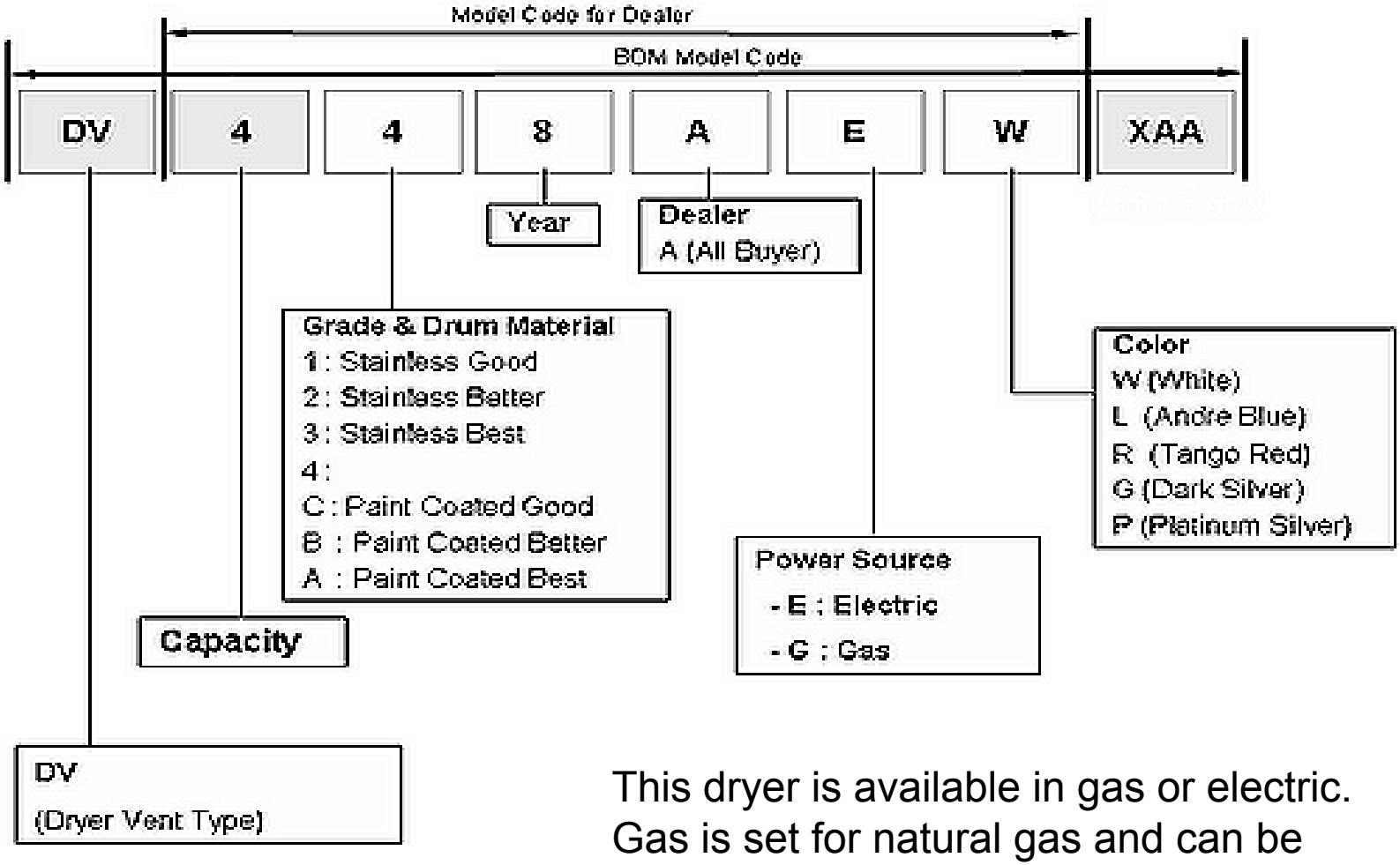
Standard Wash

DV448 Dryer New Features

Main Features

- 7.4 cu .ft.
- Energy Saving (3200 watts/cycle)
- Time Saving (Normal Course: 44 min)
- Steam Cycle

Model Number Nomenclature



This dryer is available in gas or electric. Gas is set for natural gas and can be converted to LP if necessary

2008 - 2007 Model Specifications and Comparison

		Purple (DV448AEW)		Frontier 2 (DV337AEW)	
		Color	White	Color	White
Model Specification	Capacity (cu.ft. DOE)	7.4	7.4	7.3	7.3
	Power source	Electric/Gas	Electric/Gas	Electric/Gas	Electric/Gas
	Drying Cycle	11	11	9	9
	Heater	5,300 W (22,000 Btu/hr)	5,300 W (22,000 Btu/hr)	5,300 W (22,000 Btu/hr)	5,300 W (22,000Btu/hr)
	Drying Level	5	5	5	5
	Temp Select	5	5	5	5
	Drum light	Yes	Yes	Yes	Yes
	Child lock	Yes	Yes	Yes	Yes
	Reversible Door	Yes	Yes	Yes	Yes
	Drum Material	STSS	STSS	STSS	STSS
	Window Size	15 inch	15 inch	15 inch	15 inch
	Size (WxDxH : Inch)	27 x 31.5 x38	27 x 31.5 x 38	27 x 31.5 x 38	27 x 31.5 x 38

Larger capacity, the steam feature and extra drying cycles are the major differences between the 2008 and 2007 model dryers

DV448 Water and Steam

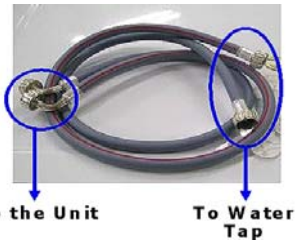
With steam in the dry cycle, wrinkled clothes are a thing of the past

Chapter 13

Washer Installation

For additional installation details see the accompanying 2008 Installation DVD

Included Washer Accessories

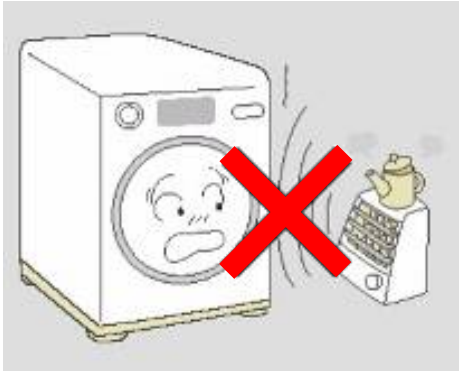
Unit	Description	Spec	Qty	Image
COMBINATION WRENCH DC60-40146A	Used to remove the shipping bolts and adjust the legs for level.	-	1	
CAPS DC97-08740D	Used to cover the holes from the shipping bolts	-	6	
ASSEMBLY-HOSE WATER DC62-00075A (hot) DC62-00075B (cold)	Used for hot and cold water supply	HOT & COLD	2	
HOSE HANGER DC97-12534B	Secures the drain hose and prevents hose kink.	-	1	

Transport Using a Hand Truck

No	Description	Image
1	Be sure to push the unit all the way onto the hand truck so the back meets the vertical support. Use a hand truck with a wider base supporting both sides of the cabinet bottom	
2	Don't Do this !!! Do not push the front side toward the vertical support as it may cause scratches and dents in the cabinet.	
3	Make sure the Drain Pump assembly is not supporting the weight of the unit, spread the weight across the entire cabinet bottom.	

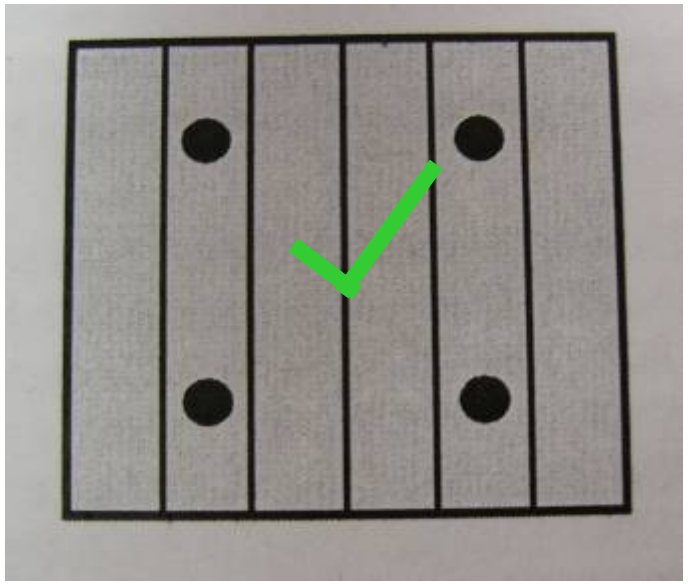
Choose the Right Location

- **Whenever possible install the unit for easy access to service.**

	The installation surface must be firm, dry and level.		**Do not install the appliance in locations where the temperature may fall below freezing.**
	Keep the unit away from direct sunlight or high humidity. Install it in a place with good ventilation.		**Keep the unit away from heaters and heating ducts.**

Install on a Stable Floor

Make sure the floor is sturdy enough to carry the weight of the machines and the laundry with water as well.



If installing on a wood floor, place the feet on the wood slats, not the seams.

Installation Location

Install the washer in a drip pan to prevent damage to the floor in the event of a water leak

Do not install the washer or dryer in a location that is hot or wet or does not have proper ventilation.

Pedestal Kit Installation

DO NOT

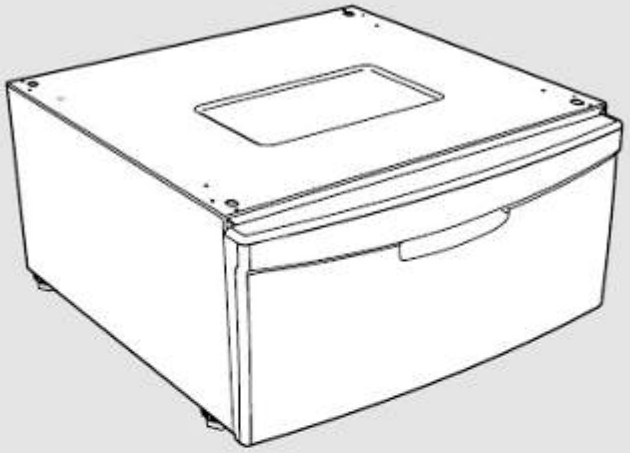
DO NOT raise or lower the washer without the shipping bolts installed

DO NOT

To prevent damage to the floor and the appliance, **DO NOT** lay the washer or dryer on a bare floor. **ALWAYS** use a pad or blanket. **NEVER** place the washer on the floor, or try to stand it up again, without the shipping bolts installed.

Pedestal Parts List

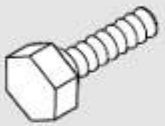
Components



X4 **A**

6002-001313

X4 **B**

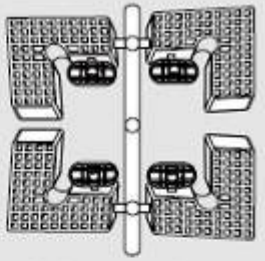


DC60-40017A

X4 **C**

DC60-60044A

X1 **D**



DC61-01811A
DC61-01812A
DC61-01813A

X4 **E**

0203-002150

X2 **F**

6002-00213

Tools

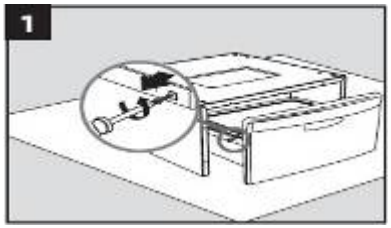
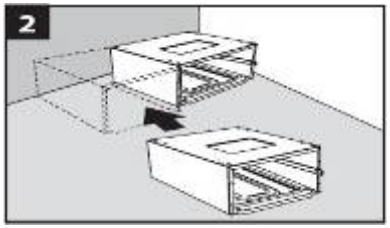
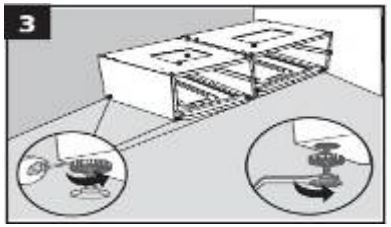
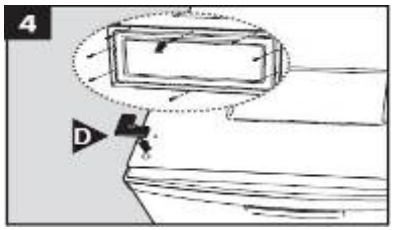
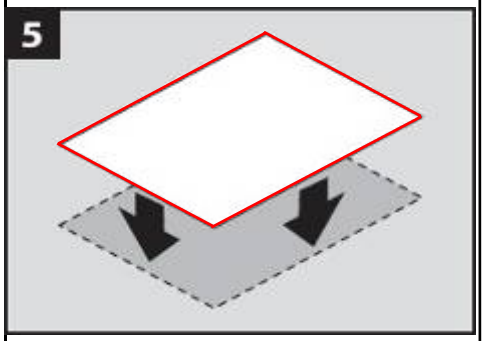
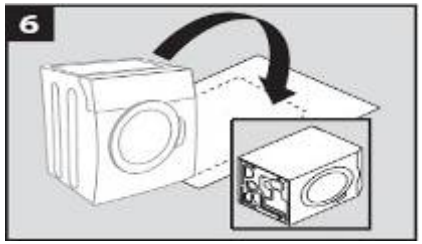
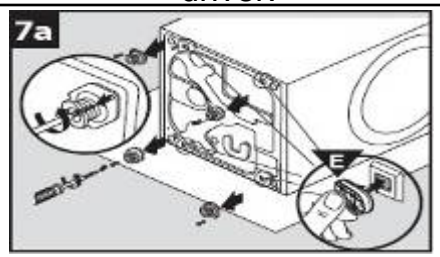
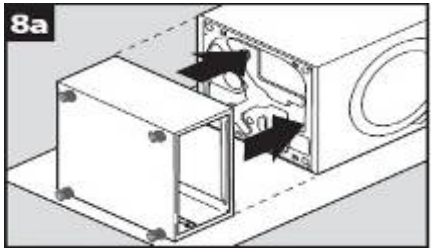
Wrench
(DC60-40146A)

Socket Wrench
[11/16 inch, or 17mm]

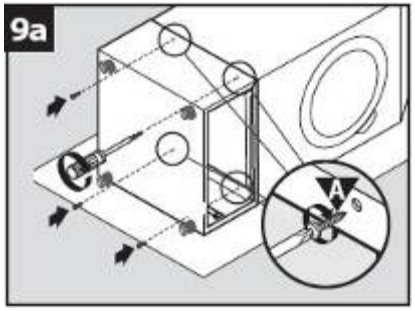
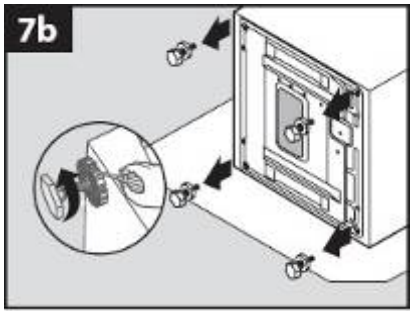
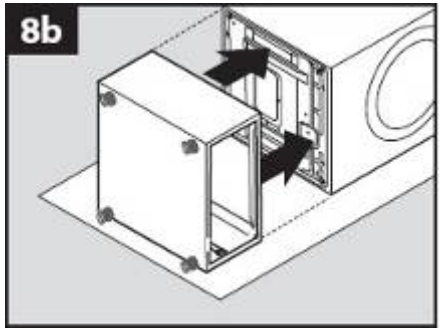
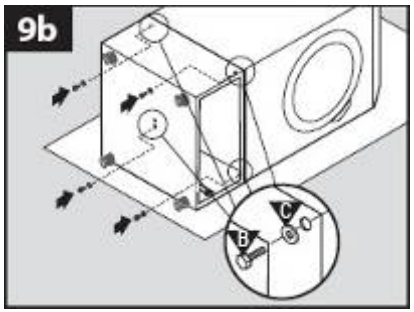
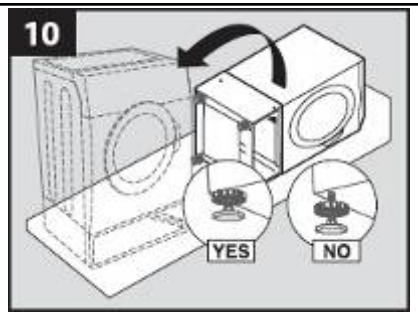
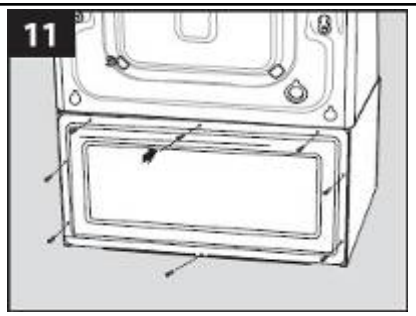
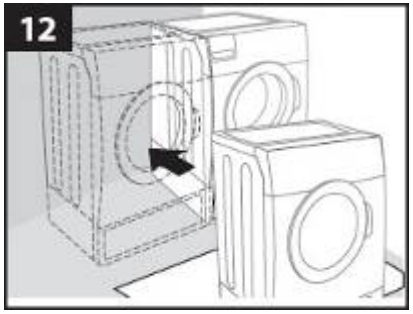
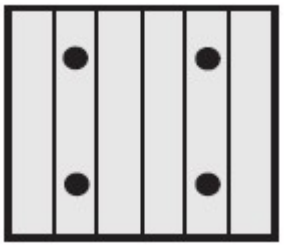
Phillips Screwdriver

Flat Screwdriver

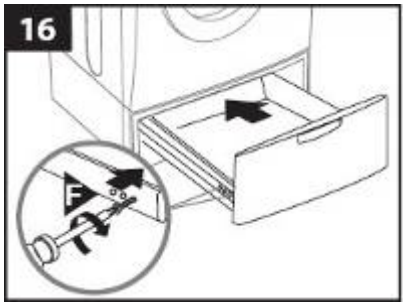
Pedestal Installation Part 1

			
Remove the side screw with a Phillips screwdriver and slide out the drawer.	Clean the floor for the installation and put the pedestal in the final location.	(A) Level it with a wrench and (b) tighten up the lock nut with a flat screw driver.	Remove the screws (8ea) on the back panel and snap in the brackets (4ea).
			
Put a soft pad (blanket) on the floor to prevent scratches during installation.	Put the Washer/Dryer on the soft pad. For the pedestal installation, the shipping bolts at the back of the washer should not be removed. Remove them after putting the unit back to its upright position (at Step 10).	Dryer Only Remove the leg assemblies (4ea) and snap the square covers into the holes (4ea).	Dryer Only Put the pedestal on the bottom

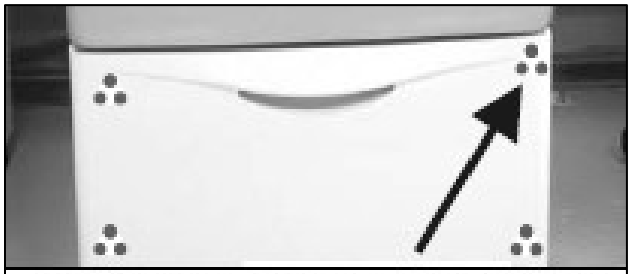
Pedestal Installation Part 2

			
Dryer Only Secure the pedestal with four screws	Washer Only Remove the leg assemblies (4ea) and snap the square covers into the holes (4ea).	Washer Only Put the pedestal on the bottom	Caution • Make sure to tighten up all the bolts between the washer and the pedestal using a socket wrench
			
Put the assembled unit back in the upright position	Screw in the 8 back panel screws. Make sure all the screws are completely fastened to prevent buzzing noise during unit operation.	Put the assembled unit in place. Check the leveling and adjust as required.	Put the legs on the same floor panels and keep the legs away from the floor seams.

Pedestal Installation Part 3



Slide the drawer back in and secure the drawer screw.



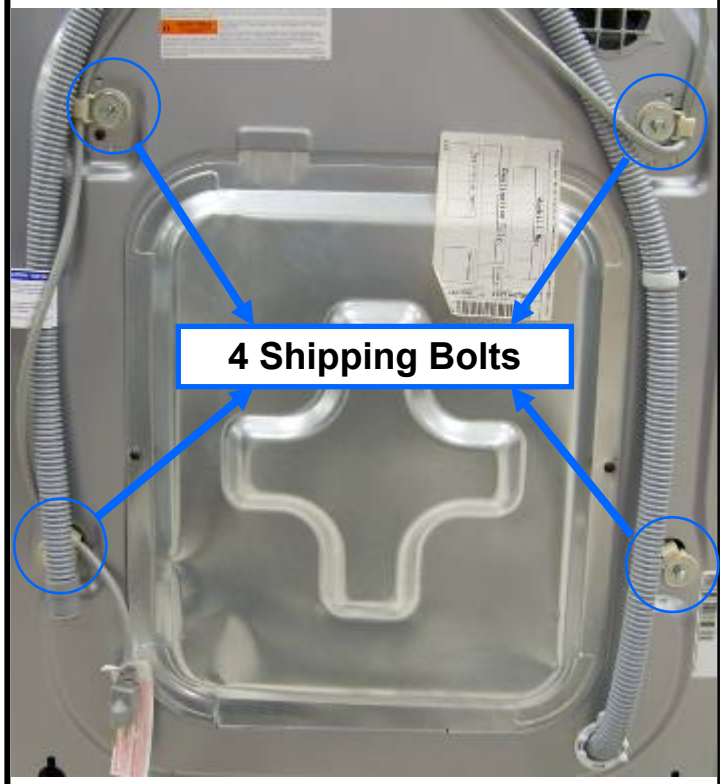
Foam Pads (at these locations on back of drawer or face of riser)

Notice!

To prevent any possible rattling sounds from the pedestal, foam pads should be attached on back of drawer or face of pedestal.

They are available at general utility shops or your dealer.

Step 1 Shipping Bolt Removal

Locations	Description
	A. Remove the 4 shipping bolts with the supplied wrench. B. Keep the shipping bolts and wrench in case the unit needs to be moved in the future. C. Cover the four holes (circled in blue) with the provided caps. Remove the shipping bolts **AFTER** the machine is ready to be placed into position. • If attaching a pedestal, remove the bolts after the installation.

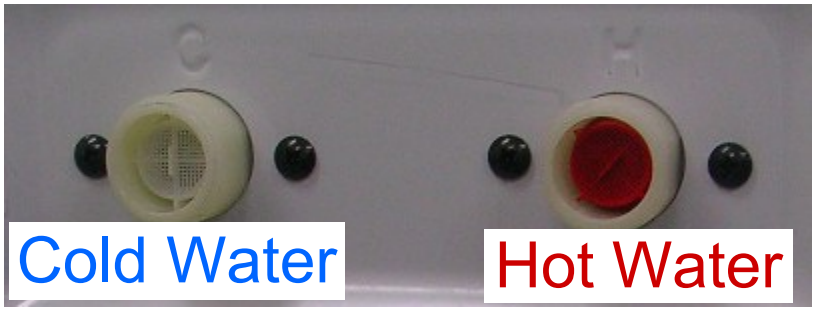
Step 2 Water Line Installation

A. Use the red striped hose to connect the hot water supply to the hot water inlet on the back of the washer.

B. Use the other hose to connect the cold water supply to the cold water inlet on the back of the washer.

C. Open the water valves and check for water leaks.

※ Do not cross thread the hoses.

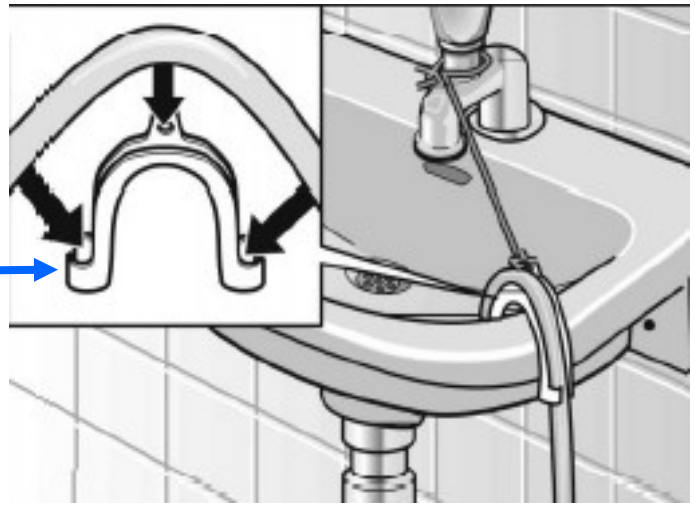


<Washer Back Panel>

To the Unit

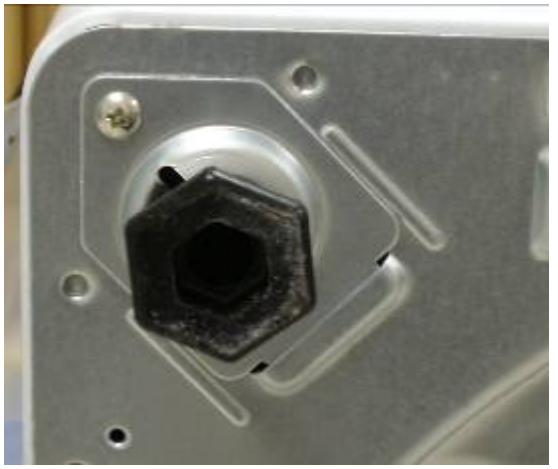
To Water Tap

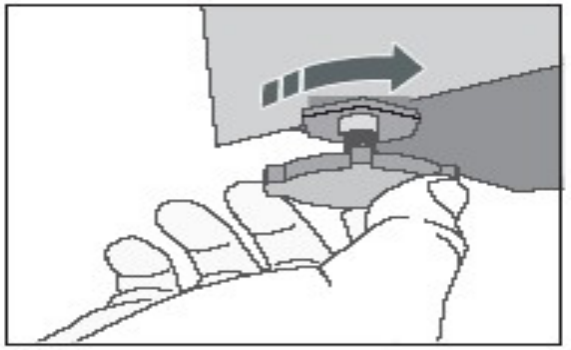
Step 3 Drain Hose Installation

Laundry Tub/Standpipe Installation	Sink Tub Installation
	
A. Loop the end of the drain hose in the elbow and insert the end of the hose into the standpipe or wall drain. The elbow prevents the hose from kinking. If the unit drains into a standpipe or wall drain, insert the drain hose as deep as possible without hitting standing water or duct-tape the open gap. This reduces the noise from the water drain operation. **B. Secure the hose in place using a strap or cable tie.**	**A. Use the loop assembly to support the hose over the edge of the sink. Loop the end of the drain hose in the elbow and hook it up over the edge of the sink .** **B. Hold the hose in place by using a strap.** **C. When draining the washer, check that the sink drainage is adequate.**

Step 4 Leveling the Washer

1. **Loosen the leg assembly by turning the lock nut counter-clockwise**
2. **Level the unit side to side and front to back by adjusting the four leg heights.**

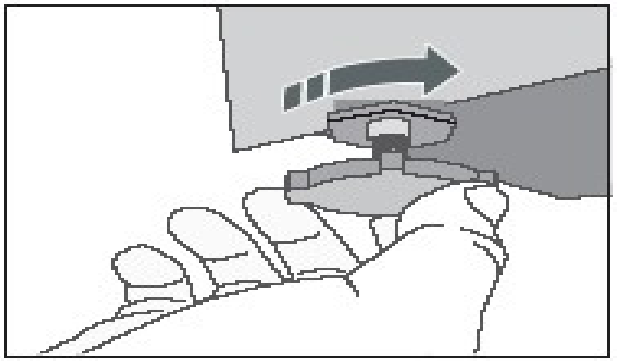




3. **Secure the legs by tightening the lock nuts on each corner against the base frame.**

Leveling the Washer

Step 5 Washer Vibration Testing

No	Description	Image
3	**Tighten the lock-nut up against the base frame.**	
4	**Put a couple of pieces of clothes inside and place paper strips under each leg. And then, put the unit into Spin Mode as follows.** **1. Press Spin + Soil Level, and then Power.** **2. When F2 Flashes, press Start/Pause repeatedly until "S" flashes.** **As its speed increases, try to pull out the paper strips.** **Notice! If you find a foot-print on the paper, or the paper is has slipped out, lower the regarding leg slightly and tighten up its lock-nut against the bottom plate. And, repeat the test until there is no slip-out or foot-print.**	

Chapter 16

Washer Technology Overview

WF448 VRT Technology

Click the camera to view the video

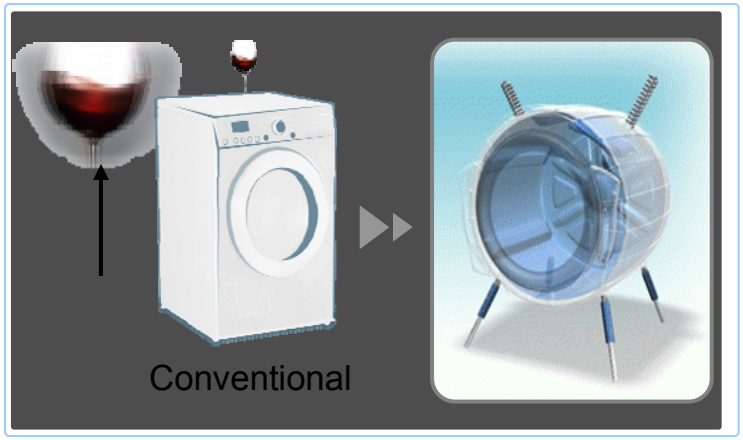
VRT or Vibration Reduction Technology is a simple but effective way of counter balancing the load inside the wash drum.

VRT Theory of Operation

Balanced load with VRT

The steel balls located in the track front and rear of the drum will find their balanced position based on the weight of the wash load.

However it takes some time before they are in a position of balance. Until the drum speed reaches approximately 300 RPM the drum will seem to be out of balance.

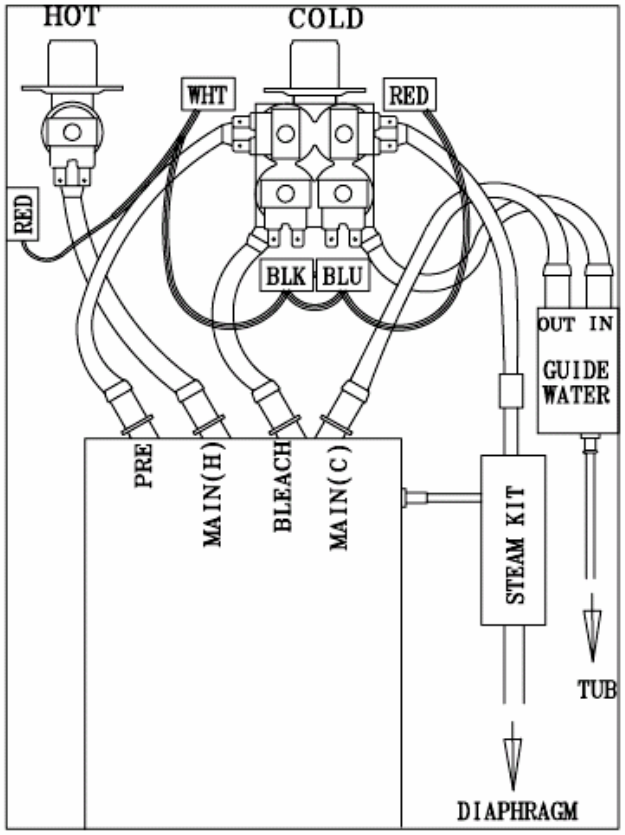


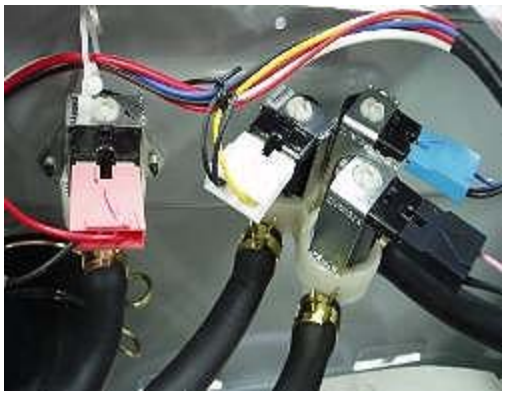
Without VRT the wash load is difficult to balance

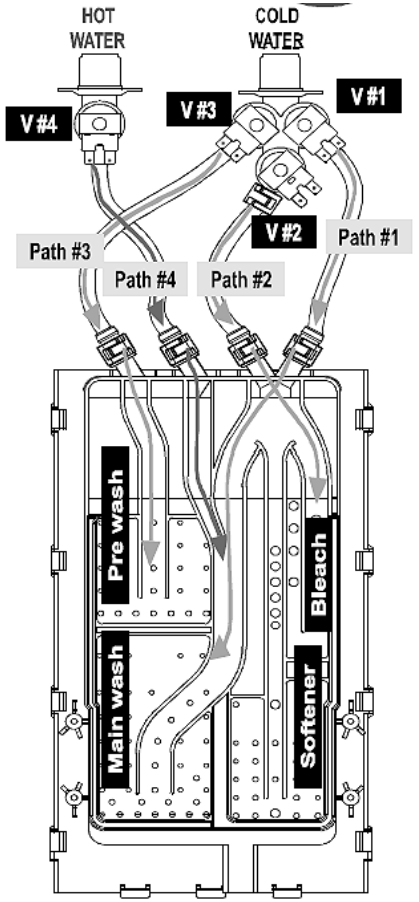
Water Fill

WATER PRESSURE - 7.25 to 116 PSI

On the large capacity washer models the water pressure requirements are 20 to 116 PSI







Depending on the washer model there may be a 2, 3 or 4 valve assembly for the cold water. There is always only one hot water valve.

Drain Pump Changes

Older drain pump – mounted
in the rear of the machine.
No clean out plug. Found in the
2006 and 2007 models.

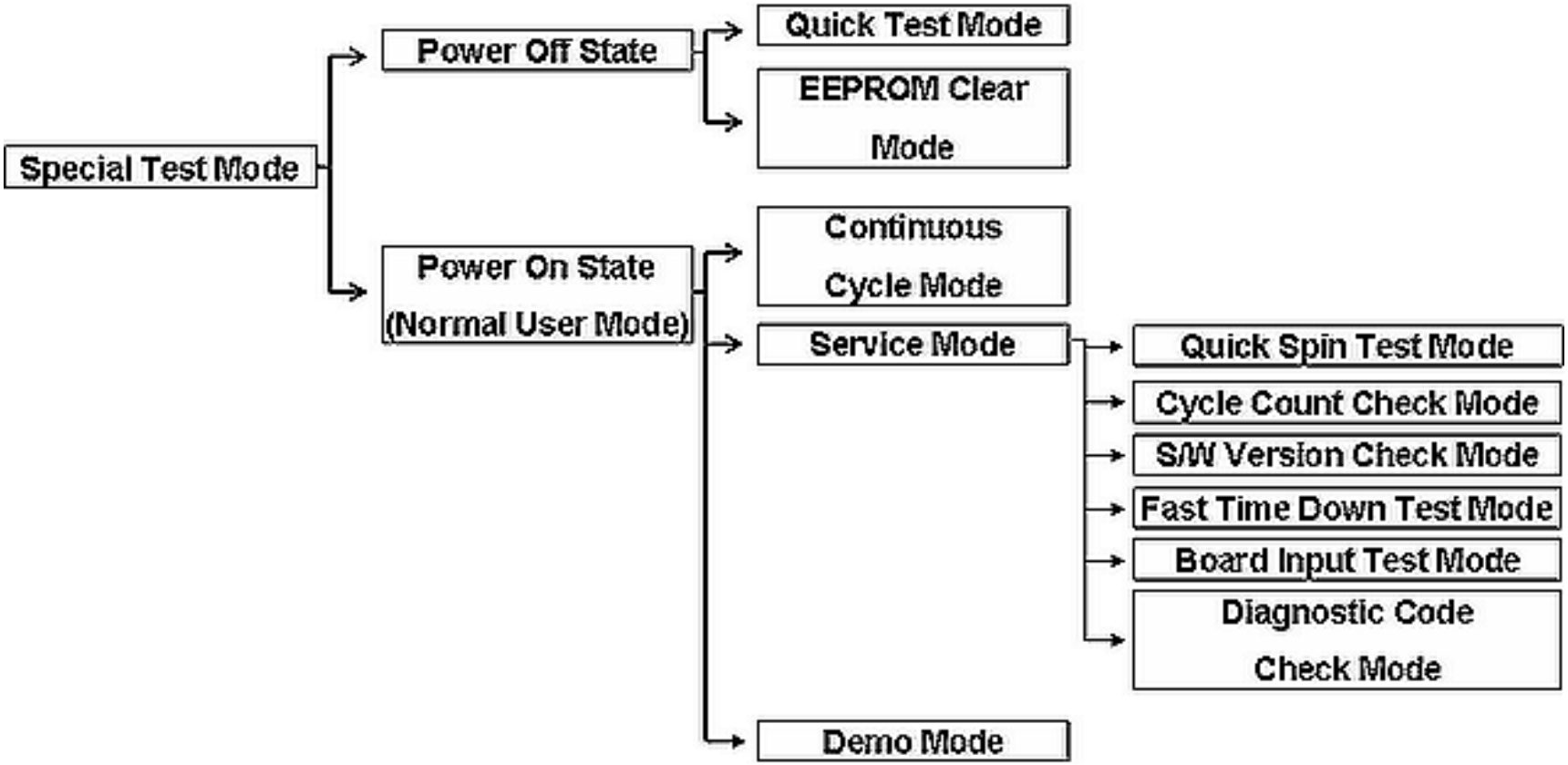
New drain/circulation pump mounted
in the front of the machine. Clean out plug
and water release hose to empty the tub.
Found in the 2008 models WF338/448
that have the steam feature.

Chapter 17

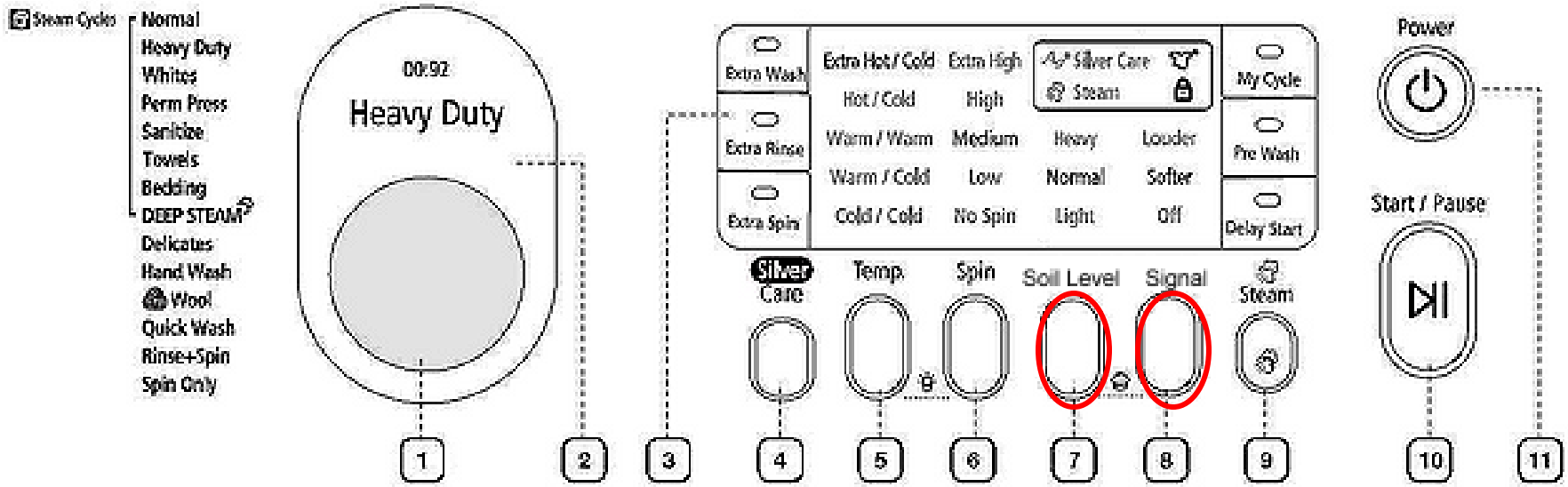
Laundry Test and Diagnostic Modes

The test and diagnostic modes will vary from model year to model year. Always consult the service manual for the model under repair for the correct procedures.

Test and Service Modes

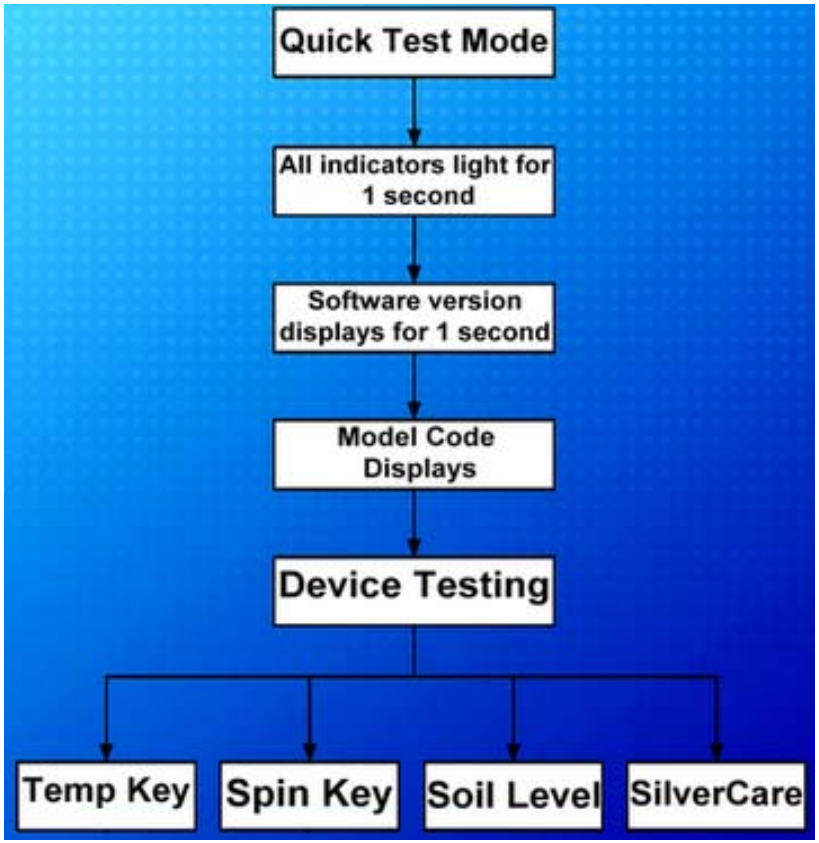


Quick Test Mode

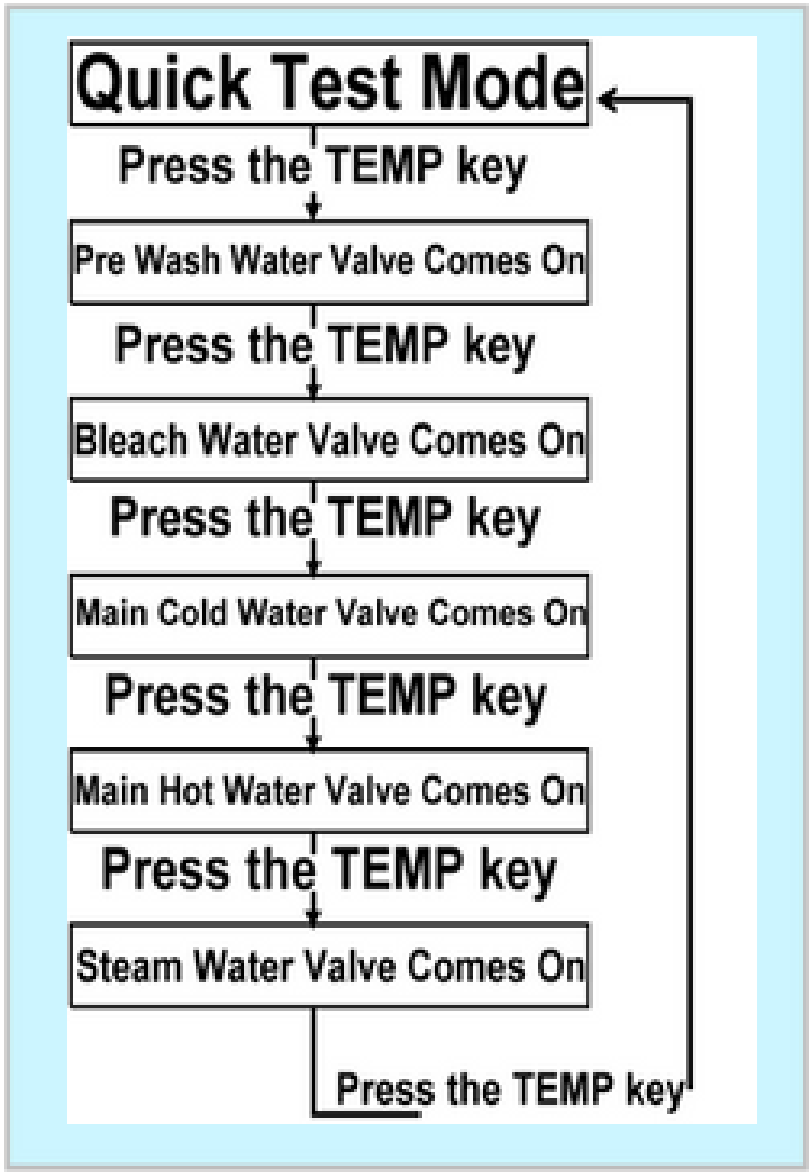


Enter the Quick Test Mode by pressing the soil level, signal and power buttons at the same time

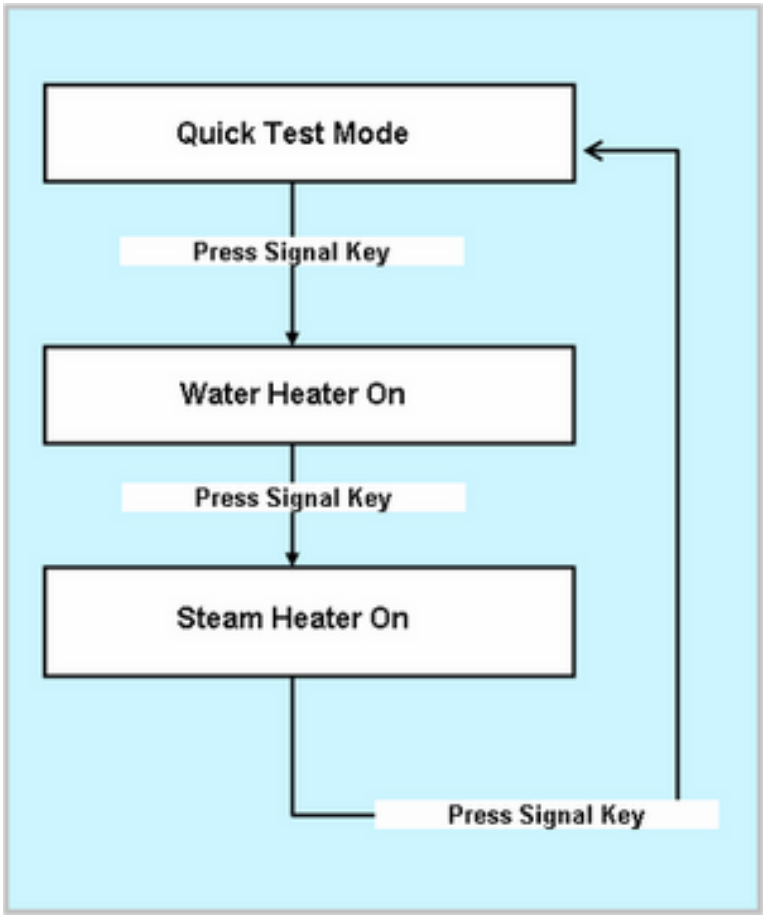
Quick Test Mode



Water Valve Check

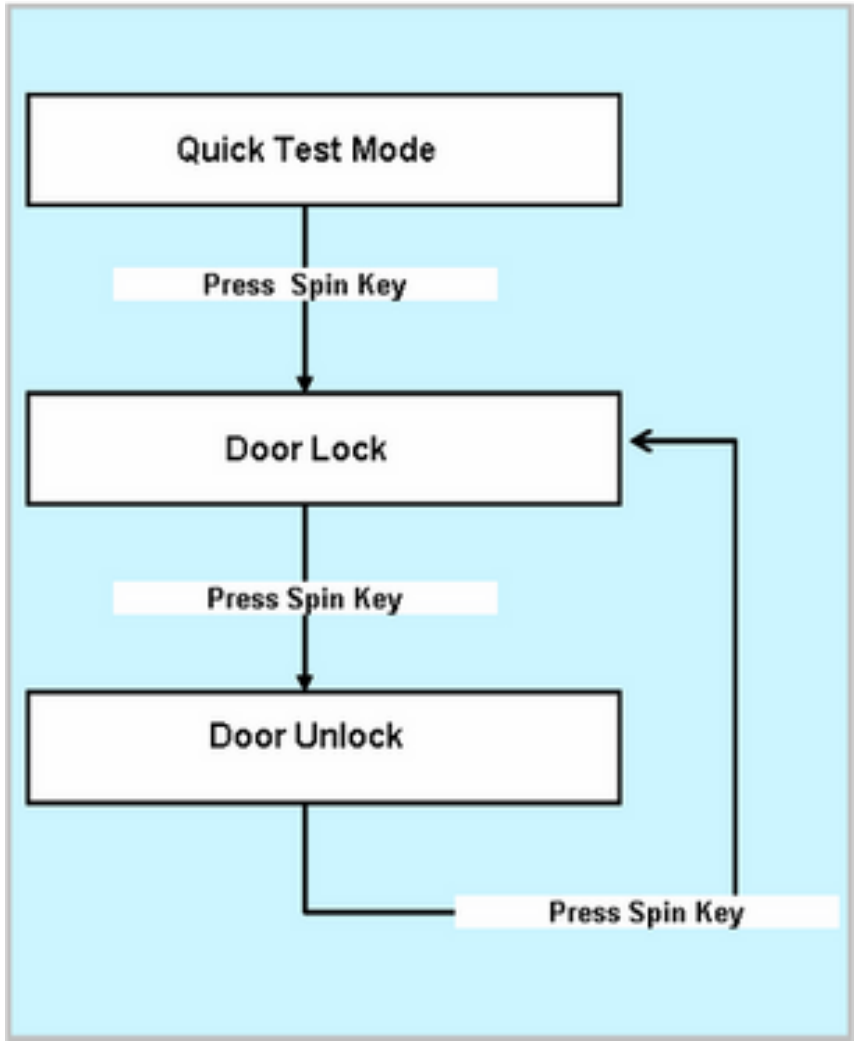

Quick Test Mode
Press the TEMP key
Pre Wash Water Valve Comes On
Press the TEMP key
Bleach Water Valve Comes On
Press the TEMP key
Main Cold Water Valve Comes On
Press the TEMP key
Main Hot Water Valve Comes On
Press the TEMP key
Steam Water Valve Comes On
Press the TEMP key

Heater Check

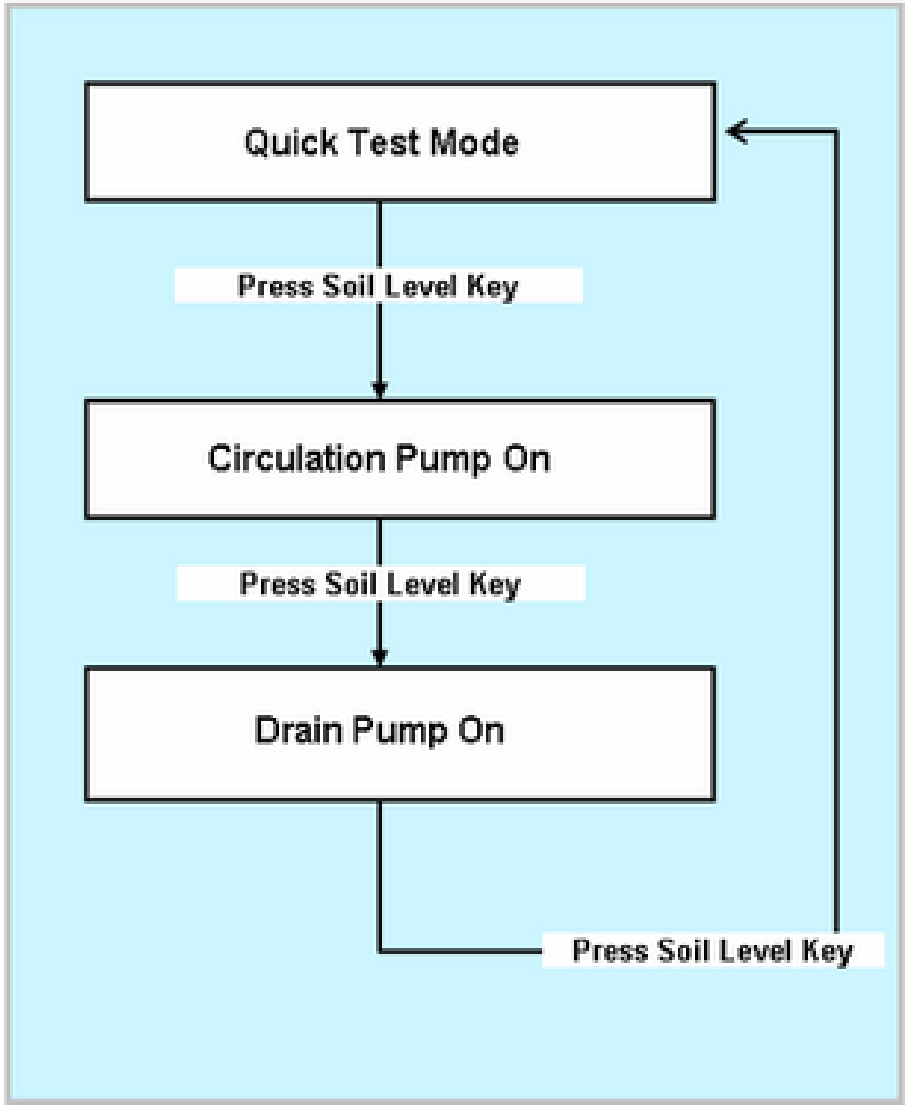


When testing the heaters you will hear the relay clicking to indicate the heater is on and the 120VAC to the heater element can be measured as well.

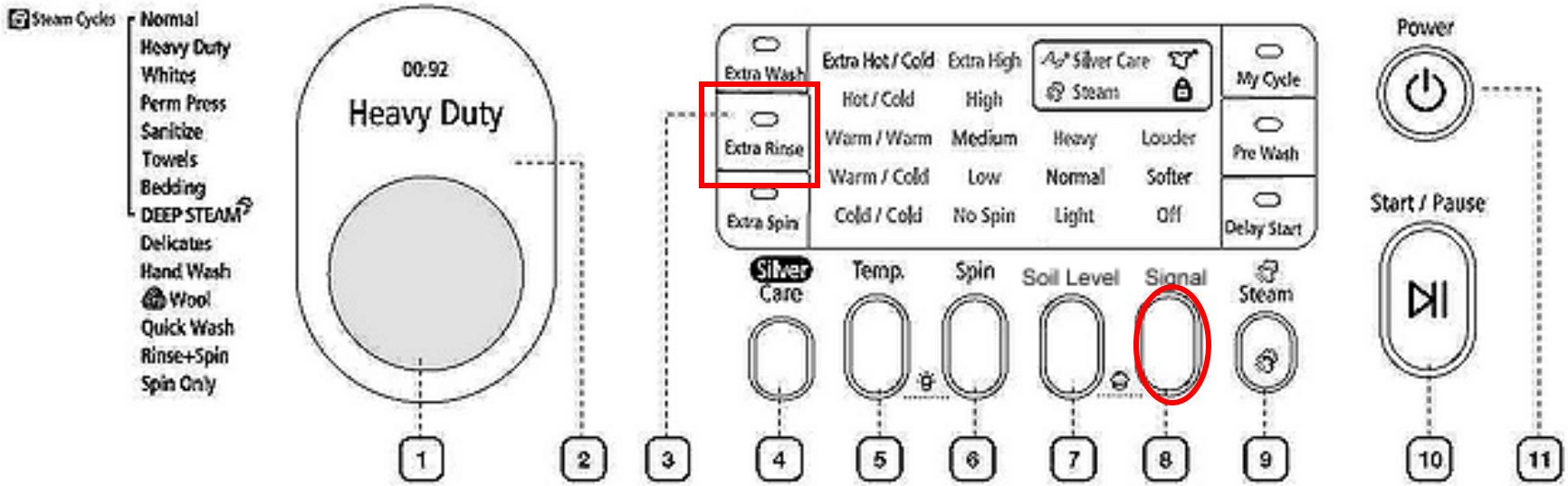
Door Lock Check



Pump Check

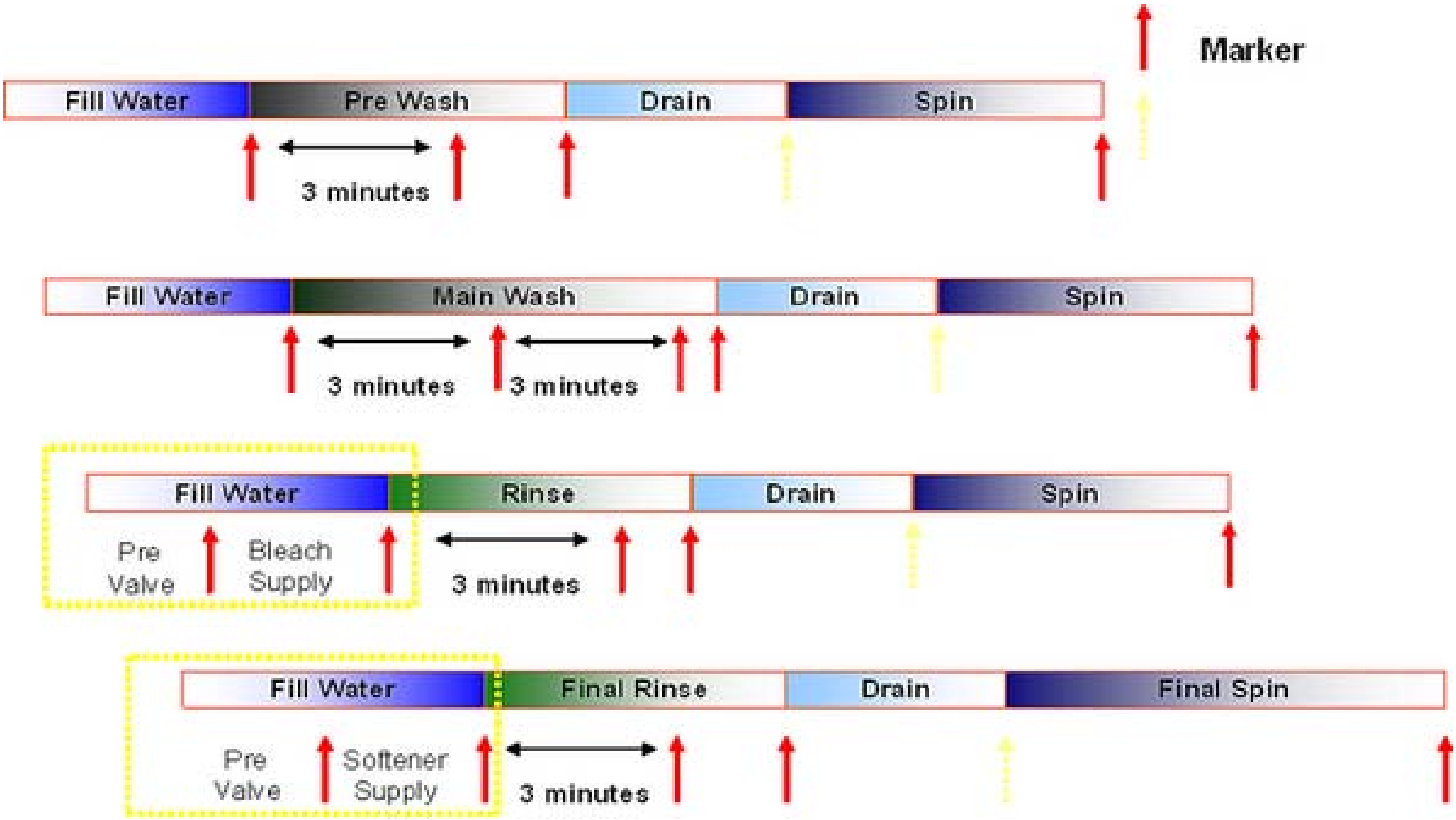

Quick Test Mode
Press Soil Level Key
Circulation Pump On
Press Soil Level Key
Drain Pump On
Press Soil Level Key

Service Mode



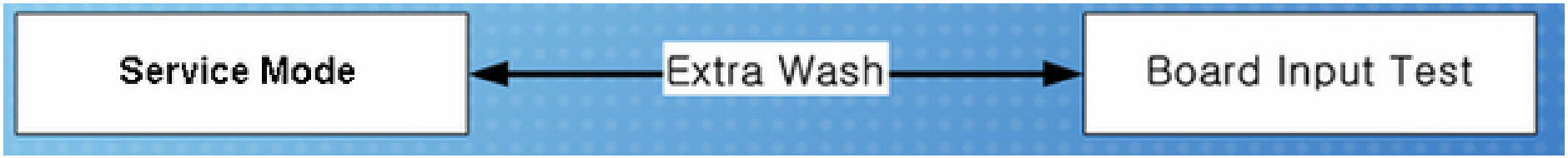
The service mode is entered with the power on and pressing the signal and extra rinse buttons together.

Fast Time Down



To enter the fast time down mode, press the temp button in the service mode

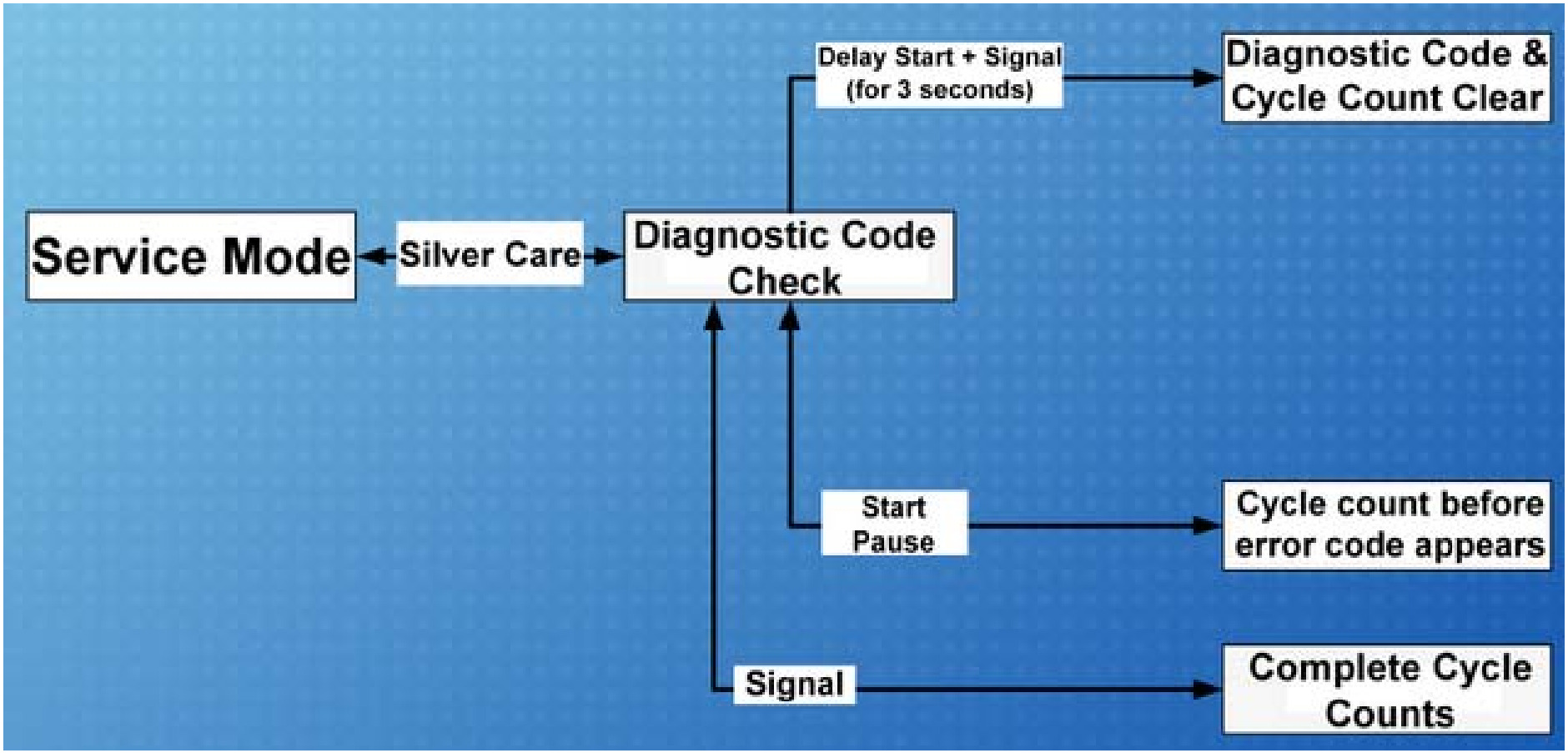
Cycle Selector Test



In the service mode press the extra wash button

Cycle selector position	Press Start	Test under item
Extra Rinse LED On		Measure internal water temperature
Extra Spin LED On		Door status (open/close)
Delay Start LED On		Door lock status (lock/unlock)
My Cycle LED On		Silver care board

Diagnostic Code Check



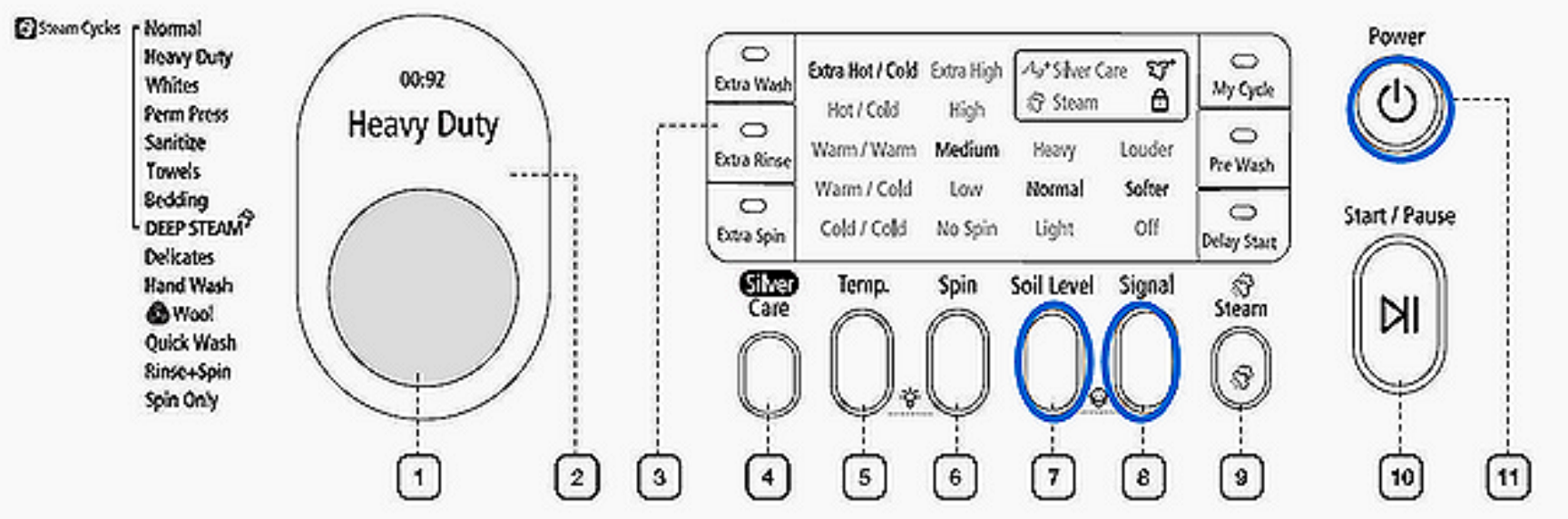
In the service mode press the silver care button until there is a flashing "d" on the LCD display. Turn the cycle selector dial either way and if there are any stored codes they will be displayed

Error Codes

NO	LED Display	Error Image	Diagnostic Code	Description	Corrective Action
1	nd	Error! No Draining	1	The water level fails to drop below the Reset Water Level within 15 minutes.	Go to "Will Not Drain" Troubleshooting Section.
2	LO	Error! Door will not unlock	2	Door fails to unlock after 7 attempts.	Go to "Will Not Unlock" Troubleshooting Section.
3	nF	Error! Low Water Pressure	3	When the filling continues for more than 15 minutes or there is no change of water level for 2 minutes.	Go to "No Water Fill" Troubleshooting Section.
4	FL	Error! Door will not lock	4	Door fails to lock after 7 attempts.	Go to "Will Not Lock" Troubleshooting Section.
5	LE	Error! Water leakage problem	8	Water Level Sensor Trouble. (When the input signal from the water level sensor is out of range, the unit will send out beeping sounds and halts the cycle.)	Go to "No Water Fill" Troubleshooting Section.
6	OE	Error! Water Supply Problem	E	A fault is detected in the water level sensor. Data (frequency) shows the water level is at or above the overflow water level. (When this condition is detected, the machine will automatically start draining water until the water level falls below the overflow water level)	First check to see that all of water valves are not stuck. If water valves are OK, check water level sensor.
7	dc	Error! Unbalanced Load	10	Unbalance or cabinet bump is detected during final spin, which prevents the drum from spinning over 150 rpm. (Never exceeds 150 RPM due to unbalanced load)	Go to "Wet Clothes" Troubleshooting section.
8	-		11	EEPROM Fault. (Program settings are being reset.)	Go to "EEPROM Clear Mode" If display shows "FAiL", replace machine control board.
9	E2	Error! A button is either stuck or being pressed continuously	15	Jammed Key. (When key input signals are output for more than 30 seconds, it is regarded as a jam.)	Check all keys. If a key is sensed to be stuck, all keys will not respond.
10	dL	Error! Door is unlocked while the washer is running	18	Door is detected as open when the motor is operating.	Check for loose wire connections. Go to "Quick Test Mode" and then do door lock unlock test and motor test.
11	dS	Error! Door is open when trying to lock	22	Door is detected as open while it is trying to lock the door.	Go to "Quick Test Mode" and then do Door Lock/Unlock Test
12	bE	Error! Motor is not working properly	25	Motor hall sensor signals come out without motor operation.	Replace Machine Control Board.
13	tE	Error! Temperature sensor problem	29	Abnormal high/low temperature or resistance (Thermal sensor or PBA) resistance.	Go to "Board Input Test" and check Water temperature. Check loose or pinched wires. Replace PCB or
14	E3	Error! Motor is not working properly	2E	MICOM is attempting to drive the motor but is not getting any response signals from the hall sensor. Visual check shows motor is not running. (locked, defective hall sensor or overload)	Evaluate wire harness for loose connections. Go to "Quick Test Mode" and test Motor.
15	Sr	Error! Power interruption	34	System Relay (Main Relay) Failure.	Replace PCB.
16	Hr	Error! Water temperature control problem	36	Heater Relay Failure (No Heater Relay Check Signal)	Replace PCB
17	3E	Error! Motor is not working properly	3E	Over-current is detected. Motor won't turn. (IPM detects over-current.)	Evaluate wire harness for loose connections. Go to "Quick Test Mode" to test Motor.
18	2E	Error! High or Low voltage detected	91	Voltage for motor control bus is over specified limit.	Replace PCB
19	2E	Error! High or Low voltage detected	92	Voltage for motor control bus is under specified limit.	Replace PCB
20	7E	Error! SilverCare	7E	Silver Care Kit (Silver Care PCB) Failure.	Check Silver Care PCB, Main PCB & Wire-harness
21	SUdS	Error! Excessive Suds	-	Suds are detected during the washing session. ("SUdS" is not an error. If the washer is in suds period, "SUdS" will light up instead of remaining time.)	Guide the user to reduce the amount of detergent used.

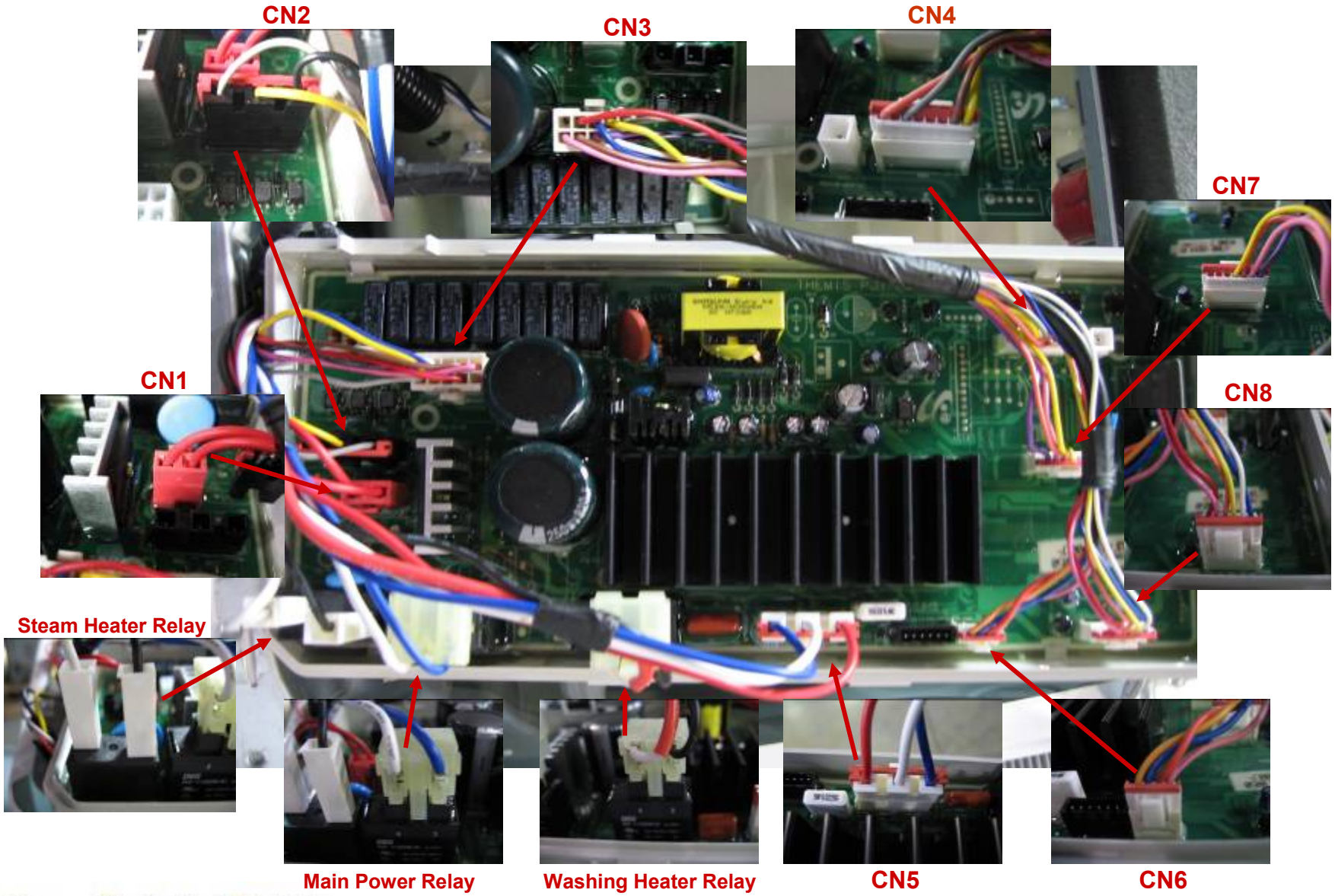
ApplianceTechnical Training

Testing the VRT System



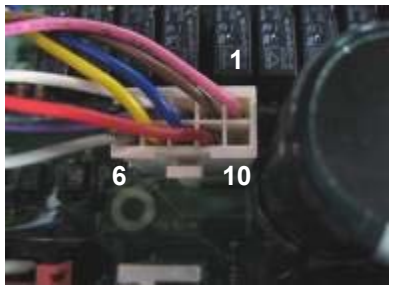
Enter the "Quick Test Mode", turn the cycle selector to "Spin" and press the "Start/Pause" button

WF448 Wiring Diagram



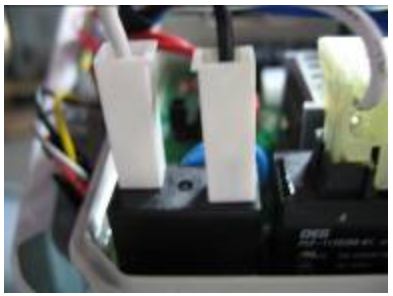
Connection Identification

CN3



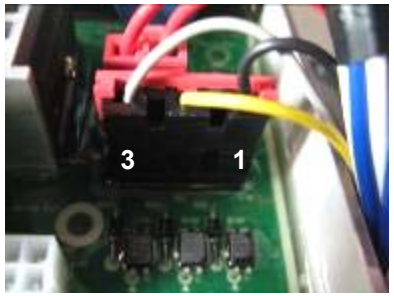
1)	Bleach Valve #3	PNK
2)	Steam Valve #5	BRN
3)	Drain Pump –	VIO
4)	Door Unlock –	WHT
5)	Door Lock -	BLK
6)	Circulation Pump –	GRY
7)	Pre Valve #2	YEL
8)	Cold Valve #4	BLU
9)	Hot Valve #1	RED
10)	Empty Pin	

RY4



1) Steam Heater Relay – WHT
2) Steam Heater Relay – BLK

CN2



1)	AC Power Port –	BLK
2)	AC Power OFF Detection -	YEL
3)	Door Detection Sensor – (LOCK – UNLOCK)	GRY

RY1

1) Main Power Relay – WHT
2) Main Power Relay – BLU

CN1

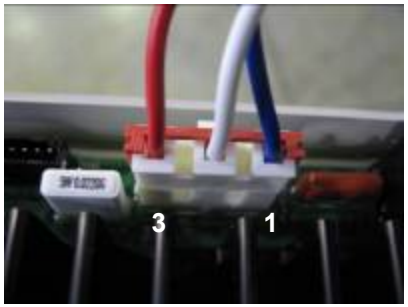
1) Reactor Connection – RED
2) Reactor Connection – RED

RY2

1) Washer Heater Relay – RED
2) Washer Heater Relay – BLK

Connection Identification

CN5



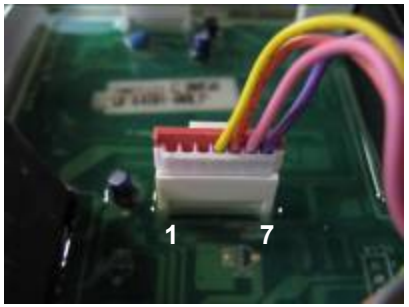
1) Motor Power (U Phase) – BLU
2) Motor Power (V Phase) – WHT
3) Motor Power (W Phase) – RED

Resistance at Pin # 1 and # 2 of CN5 = ~12Ω

Resistance at Pin # 1 and # 3 of CN5 = ~12Ω

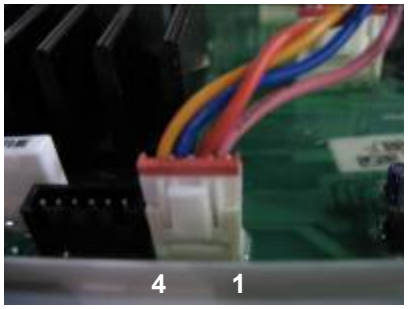
Resistance at Pin # 2 and # 3 of CN5 = ~12Ω

CN7



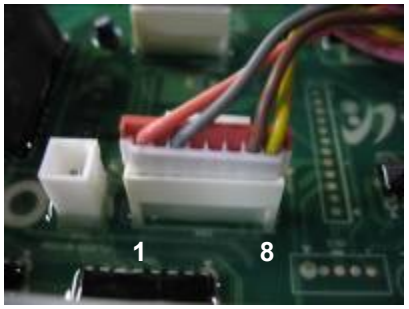
1) Empty Pin
2) Empty Pin
3) Empty Pin
4) Washer Water – YEL
5) Temp Sensor – Ground – RED
6) Washing Water Level Sensor – PNK
7) Washer Water Level Sensor – VIO

CN6



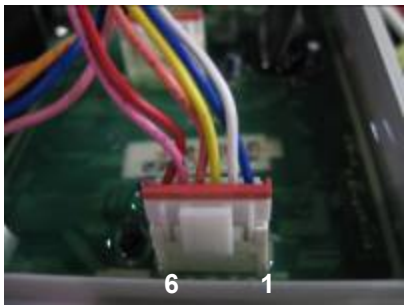
1) 5V – PNK
2) Hall Sensor Signal – RED
3) Hall Sensor Signal – BLU
4) Ground – ORG

CN4



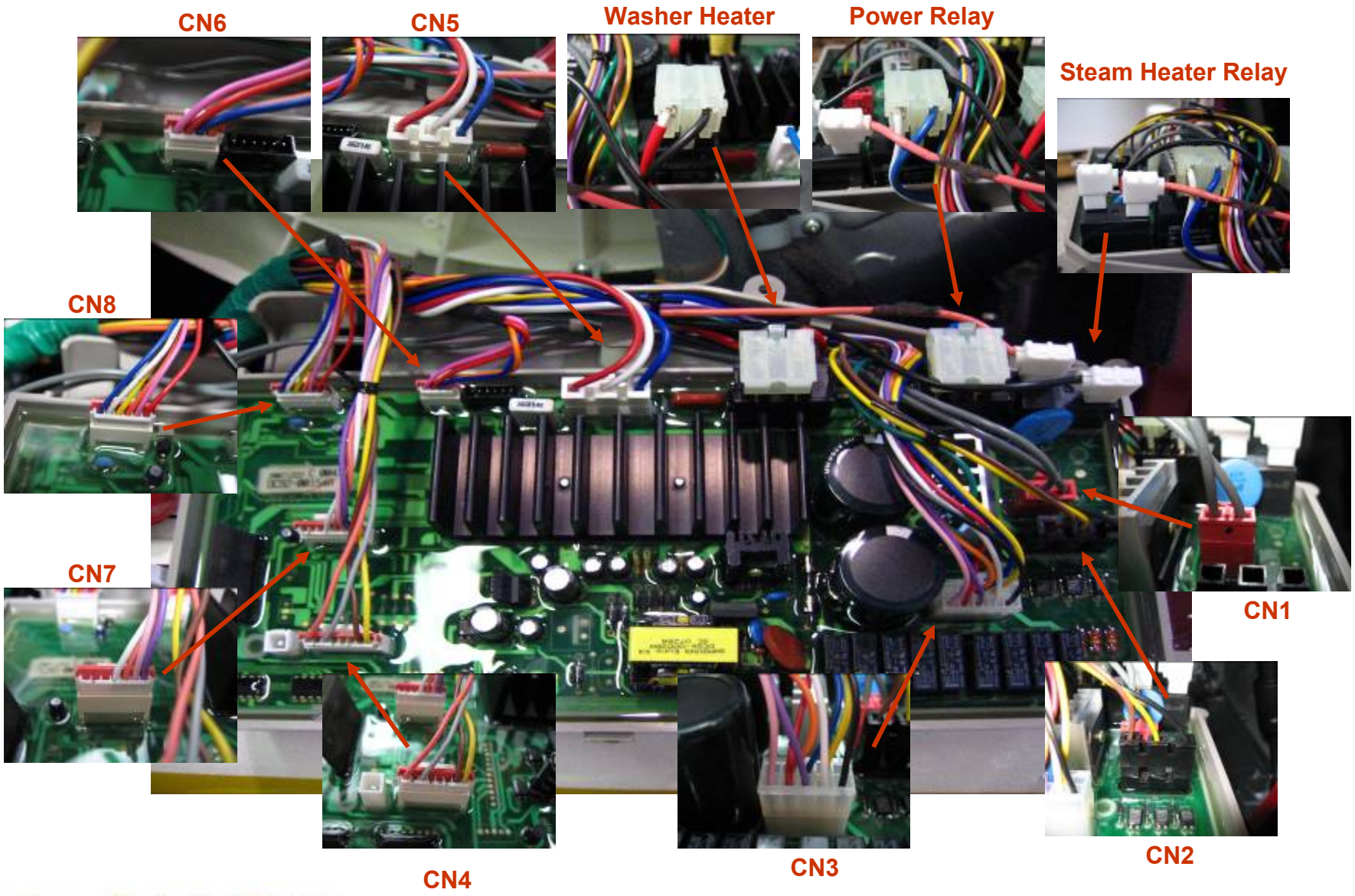
1) Door Switch – PNK
2) Empty Pin
3) Door Switch – GRY
4) Empty Pin
5) Empty Pin
6) Empty Pin
7) Ag Sensor – BRN
8) Ag Sensor - YEL

CN8



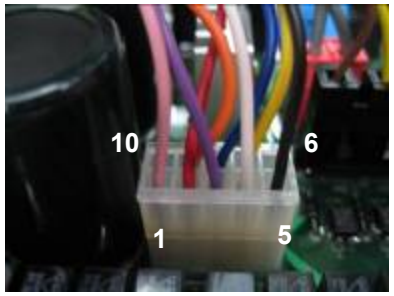
1) Communications (Rx) – BLU
2) Communications (Tx) – WHT
3) Rest Signal Output – YEL
4) Ground – ORG
5) 5V – PNK
6) 15V – RED

WF338 Wiring Diagram



Connection Identification

CN3

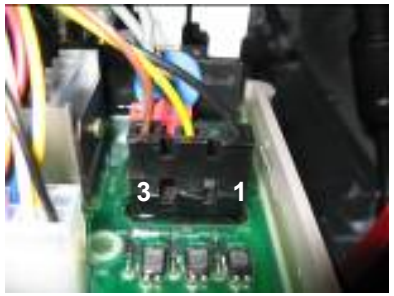


1) Bleach Valve – PNK
2) Steam Valve – RED
3) Drain Pump – VIO
4) Door Unlock – WHT
5) Door Lock - BLK
6) Empty
7) Pre Valve – YEL
8) Cold Valve – BLU
9) Hot Valve – ORG
10) Empty Pin

RY4

1) Steam Heater Relay – BLK
2) Steam Heater Relay – ORG

CN2



1) AC Power Port – BLK
2) AC Power OFF Detection - YEL
3) Door Detection Sensor – BRN (LOCK – UNLOCK)

RY1

1) Main Power Relay – WHT
2) Main Power Relay – BLU

CN1

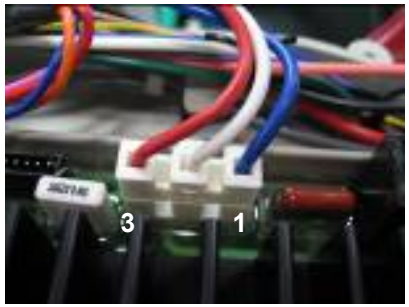
1) Reactor Connection – GRY
2) Reactor Connection – GRY

RY2

1) Washer Heater Relay – RED
2) Washer Heater Relay – BLK

Connection Identification

CN5

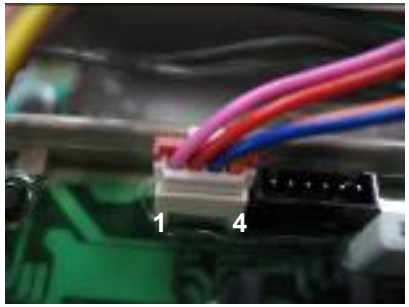


1) Motor Power (U Phase) – BLU
2) Motor Power (V Phase) – WHT
3) Motor Power (W Phase) – RED

CN7

1) Empty Pin
2) Empty Pin
3) Empty Pin
4) Washer Water – WHT
5) Temp Sensor Ground – RED
6) Washing Water Level Sensor – PNK
7) Washer Water Level Sensor – VOL

CN6



1) 5V – PNK
2) Hole Sensor Signal – RED
3) Hole Sensor Signal – BLU
4) Ground – ORG

CN4

1) Door Switch – PNK
2) Empty Pin
3) Door Switch – GRY
4) Empty Pin
5) Empty Pin
6) Empty Pin
7) Ag Sensor – BRN
8) Ag Sensor - YEL

CN8

1) Communications (Rx) – BLU
2) Communications (Tx) – WHT
3) Rest Signal Output – YEL
4) Ground – ORG
5) 5V – PNK
6) 15V – RED

Connector Checks

Thermistor Check
Check Voltage at Pin #6 and #3 of CN3
Tester Check = DC2.5V
If it reads 5V, check if its connector is engaged properly.

Door Switch Check
Check Voltage at Pin #6 and #4 of CN3
When Door Open = DC5V
When Door Close = DC0V

Water Sensor Check
Check Voltage and Frequency at Pin #6 and #7 of CN3 Reset water level = DC2.5V, 25.8KHz
Check Voltage and Frequency at Pin #6 and #8 of CN3 Reset water level = DC2.5V, 25.8KHz

Hall Sensor Check
Check Voltage at Pin #4 and #2 of CN8
Tester Check = DC0V or 3.75V
Check Voltage at Pin #4 and #3 of CN8
Tester Check = DC0V or 3.75V

Motor Check
Resistance at Pin #1 and #2 of CN9 =11.6Ω
Resistance at Pin #1 and #3 of CN9 =11.6Ω
Resistance at Pin #2 and #3 of CN9 =11.6Ω

Door Lock Check
Check Voltage at Pin #1 of CN5 and Pin #7 of CN10
When Door Lock = AC120V
Check Voltage at Pin #1 of CN5 and Pin #2 of CN7
When Door Lock = AC120V

Door Unlock Check
Check Voltage at Pin #1 of CN5 and Pin #8 of CN10
When Door Unlock = AC120V

Drain Motor Check
Check Voltage at Pin #1 of CN5 and Pin #6 of CN10
When Drain Pump operates = AC120V

Water Valve Check
Check Voltage at Pin #1 of CN5 and Pin #1,2,3,4 of CN10
When each Valve operates = AC120V

AC Power Check
Check Voltage at Pin #1 and #3 of CN5
Check Voltage at Pin #1 of CN5 and Pin #1 of CN6
Tester Check = AC120V

Heater Relay Check
Check Voltage at Pin #1 of CN5 and Pin #2 of RY9
When Heater Relay operates = AC120V

*These are typical checks. Always consult the service manual for the model under repair

Connector Checks Non-VRT WF306/316

Water Temp Thermistor Check
Power On, Check voltage at pins #6 (Org) & # 3 (Wht) of CN3 room temp approximately 2.5vdc. With CN3 disconnected resistance is approximately 13kΩ If there is a Thermistor fault code, Power Off, check pins 3 (Wht) & 4 (Brn) of CN3 for an open or resistance to chassis . (Possible cut or pinched wire)

Door Switch Check
Power On, check voltage at pins #6 (Org) & # 4 (Brn) of CN3 Door open 5VDC, Door closed 0vdc. Power off, resistance between pins open with door open, short with door closed.

Water Level Sensor Check
Power On, Check voltage at pins #6 (Org) & # 7 (Vio) of CN3 No water in washer 2.5VDC. Pins #6 (Org) & #8 (Pnk) of CN3 No water in washer 2.5VDC. Power Off, check resistance between two outside sensor connectors, 22Ω to 24Ω, open to center connector.

Hall Sensor Check
Manually turn basket (motor) to see voltage change. Power On, Check voltage at pins #4 (Org) & # 2 (Red) of CN8 = 0VDC or 3.75VDC. Check voltage at pins #4 (Org) & # 3 (Blu) of CN8 = 0VDC or 3.75VDC

Motor Check
Power off, disconnect CN9. Resistance Pins #1 (Blu) & #2 (Wht) of CN9 = 11.6Ω, Pins #1 (Blu) & #3 (Red) of CN9 = 11.6Ω, Pins #2 (Wht) & #3 (Red) of CN9 = 11.6Ω

A/C Power Check
Power off or on, Check voltage at Pins 1 (Wht) & 3 (Blu) of CN5

Door Lock Check
Check voltage at pins #1 (Wht) of CN5 & # 2 (Blk) of CN7 When Door is Locked 120VAC, Unlocked 0VAC. Power On, Check voltage at pins #3 (Blu) of CN5 & # 7 (Sky) of CN10 When Door is Locked or Unlocked there is a pulse of 120VAC for a few milliseconds. With Power Off, resistance between these pins will be between 56 - 62Ω

Door Unlock Check
Check voltage at pins #1 (Wht) of CN5 & # 2 (Blk) of CN7 When Door is Locked 120VAC, Unlocked 0VAC. Power On, Check voltage at pins #3 (Blu) of CN5 & # 8 (Wht) of CN10 When Door is Locked or Unlocked there is a pulse of 120VAC for a few milliseconds. With Power Off, resistance between these pins will be between 56 - 62Ω

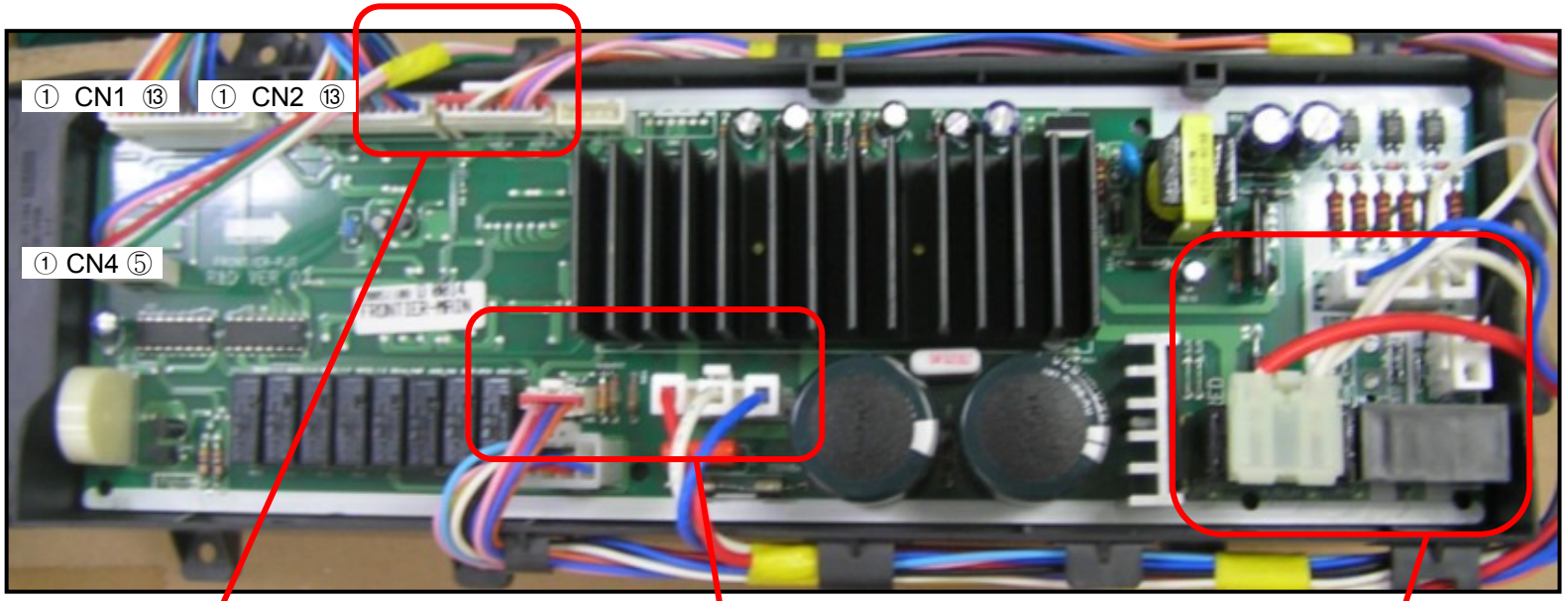
Drain Motor Check
Power on, Check voltage at Pins #3 (Blu) of CN5 & #6 (Blk) of CN10 120VAC when pump on, 0VAC when off. Power Off, Resistance between pins should be 13.8Ω

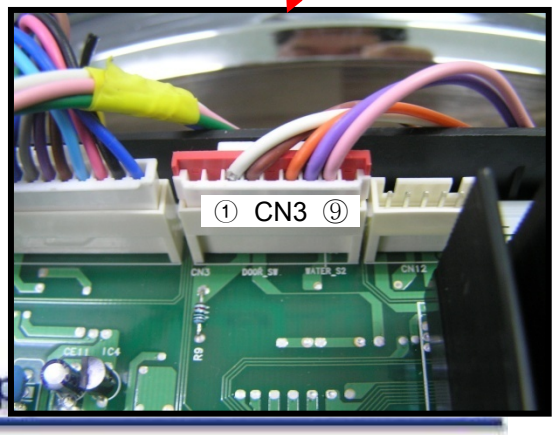
Water Valve Check
Power on, Check voltage at Pins 3 (Blu) of CN5 & #1 (Blu), 2 (Red), 3 (Yel), 4 (Pnk) of CN10. When each valve operates 120VAC. Power Off, valve resistance is from 1202Ω - 1245Ω

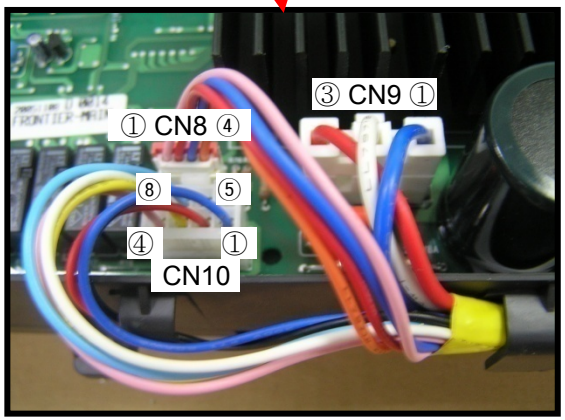
Heater relay Check
Power on, Check voltage at Pins 3 (Blu) of CN5 & #1 (Red) of RY9 Heater on 120VAC & off 0VAC.

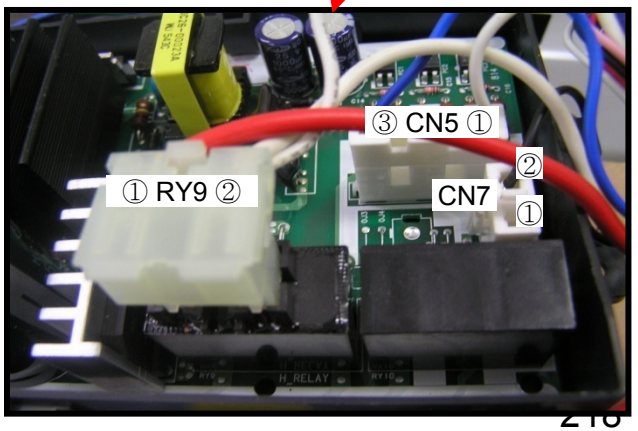
*These are typical checks.
Always consult the service manual for the model under repair

Internal Wiring Non Steam Models









Connector Checks Frontier I

Water Temp Thermistor Check
Power On, Check voltage at pins #6(Org) & # 3(Wht) of CN3 room temp approximately 2.5vdc. With CN3 disconnected resistance is approximately 13kΩ
If there is a Thermistor fault code, Power Off, check pins 3(Wht) & 4 (Brn) of CN3 for an open or resistance to chassis . (Possible cut or pinched wire)

Door Switch Check
Power On, Check voltage at pins #6(Org) & # 4(Brn) of CN3 Door open 5 vdc, Door closed 0vdc. Power Off, resistance between pins open with door open, short with door closed.

Water Level Sensor Check
Power On, Check voltage at pins #6(Org) & # 7(Vio) of CN3 No water in washer 2.5vdc. Pins #6(Org) & #8(Pnk) of CN3 No water in washer 2.5vdc.

Hall Sensor Check
Manually turn basket (motor) to see VDC change. Power On, Check voltage at pins #4(Org) & # 2(Red) of CN8 = 0vdc or 3.75vdc. Check voltage at pins #4(Org) & # 3(Blu) of CN8 = 0vdc or 3.75vdc

Motor Check
Power off, disconnect CN9. Resistance Pins #1(Blu) & #2(Wht) of CN9 = 11.6Ω, Pins #1(Blu) & #3(Red) of CN9 = 11.6Ω, Pins #2(Wht) & #3(Red) of CN9 = 11.6Ω

A/C Power Check
Power off or on, Check voltage at Pins 1(Wht) & 3(Blu) of CN5

Door Lock Check
Check voltage at pins #1(Wht) of CN5 & # 2(Blk) of CN7 When Door is Locked 120vac, Unlocked 0vac. Power On, Check voltage at pins #3(Blu) of CN5 & # 7(Sky) of CN10 When Door is Locked or Unlocked there is a pulse of 120vac for a few milliseconds. With Power Off, resistance between these pins will be between 56 - 62Ω

Door Unlock Check
Check voltage at pins #1(Wht) of CN5 & # 2(Blk) of CN7 When Door is Locked 120vac, Unlocked 0vac.Power On, Check voltage at pins #3(Blu) of CN5 & # 8(Wht) of CN10 When Door is Locked or Unlocked there is a pulse of 120vac for a few milliseconds. With Power Off, resistance between these pins will be between 56 - 62Ω

Drain Motor Check
Power on, Check voltage at Pins #3(Blu) of CN5 & #6(Blk) of CN10 120vac when pump on, 0vac when off. Power Off, Resistance between pins should be 13.8Ω

Water Valve Check
Power on, Check voltage at Pins 3(Blu) of CN5 & #1(Blu),2(Red),3(Yel),4(Pnk) of CN10. When each valve operates 120vac. Power Off ,valve resistance is from 1202Ω - 1245Ω

Heater relay Check
Power on, Check voltage at Pins 3(Blu) of CN5 & #1(Red) of RY9 Heater on 120vac & off 0vac.

Appliance Technical Training

Connector Checks Frontier II (VRT)

Water Temp Thermistor Check
Power On, Check voltage at pins #6(Org) & # 3(Wht) of CN3 room temp approximately 4.2vdc. With CN3 disconnected resistance is approximately 57kΩ

Door Switch Check
Power On, Check voltage at pins #6(Org) & # 4(Brn) of CN3 Door open 10.5 vdc, Door closed 0vdc.

Water Level Sensor Check
Power On, Check voltage at pins #6(Org) & # 7(Vio) of CN3 No water in washer 2.5vdc. Pins #6(Org) & #8(Pnk) of CN3 No water in washer 2.5vdc.

Hall Sensor Check
Manually turn basket (motor) to see VDC change. Power On, Check voltage at pins #4(Org) & # 2(Red) of CN8 = 0vdc or 3.75vdc. Check voltage at pins #4(Org) & # 3(Blu) of CN8 = 0vdc or 3.75vdc

Motor Check
Power off, disconnect CN9. Resistance Pins #1(Blu) & #2(Wht) of CN9 = 11.6Ω, Pins #1(Blu) & #3(Red) of CN9 = 11.6Ω, Pins #2(Wht) & #3(Red) of CN9 = 11.6Ω

A/C Power Check
Power off or on, Check voltage at Pins 1(Wht) & 3(Blu) of CN5

Door Lock Check
Check voltage at pins #1(Wht) of CN5 & # 2(Blk) of CN7 When Door is Locked 120vac, Unlocked 0vac. Power On, Check voltage at pins #3(Blu) of CN5 & # 7(Sky) of CN10 When Door is Locked or Unlocked there is a pulse of 120vac for a few milliseconds. With Power Off, resistance between these pins will be between 56 - 62Ω

Door Unlock Check
Check voltage at pins #1(Wht) of CN5 & # 2(Blk) of CN7 When Door is Locked 120vac, Unlocked 0vac.Power On, Check voltage at pins #3(Blu) of CN5 & # 8(Wht) of CN10 When Door is Locked or Unlocked there is a pulse of 120vac for a few milliseconds. With Power Off, resistance between these pins will be between 56 - 62Ω

Drain Motor Check
Power on, Check voltage at Pins #3(Blu) of CN5 & #6(Blk) of CN10 120vac when pump on, 0vac when off. Power Off, Resistance between pins should be 13.8Ω

Water Valve Check
Power on, Check voltage at Pins 3(Blu) of CN5 & #1(Blu),2(Red),3(Yel),4(Pnk) of CN10. When each valve operates 120vac. Power Off, valve resistance is from 1202Ω - 1245Ω

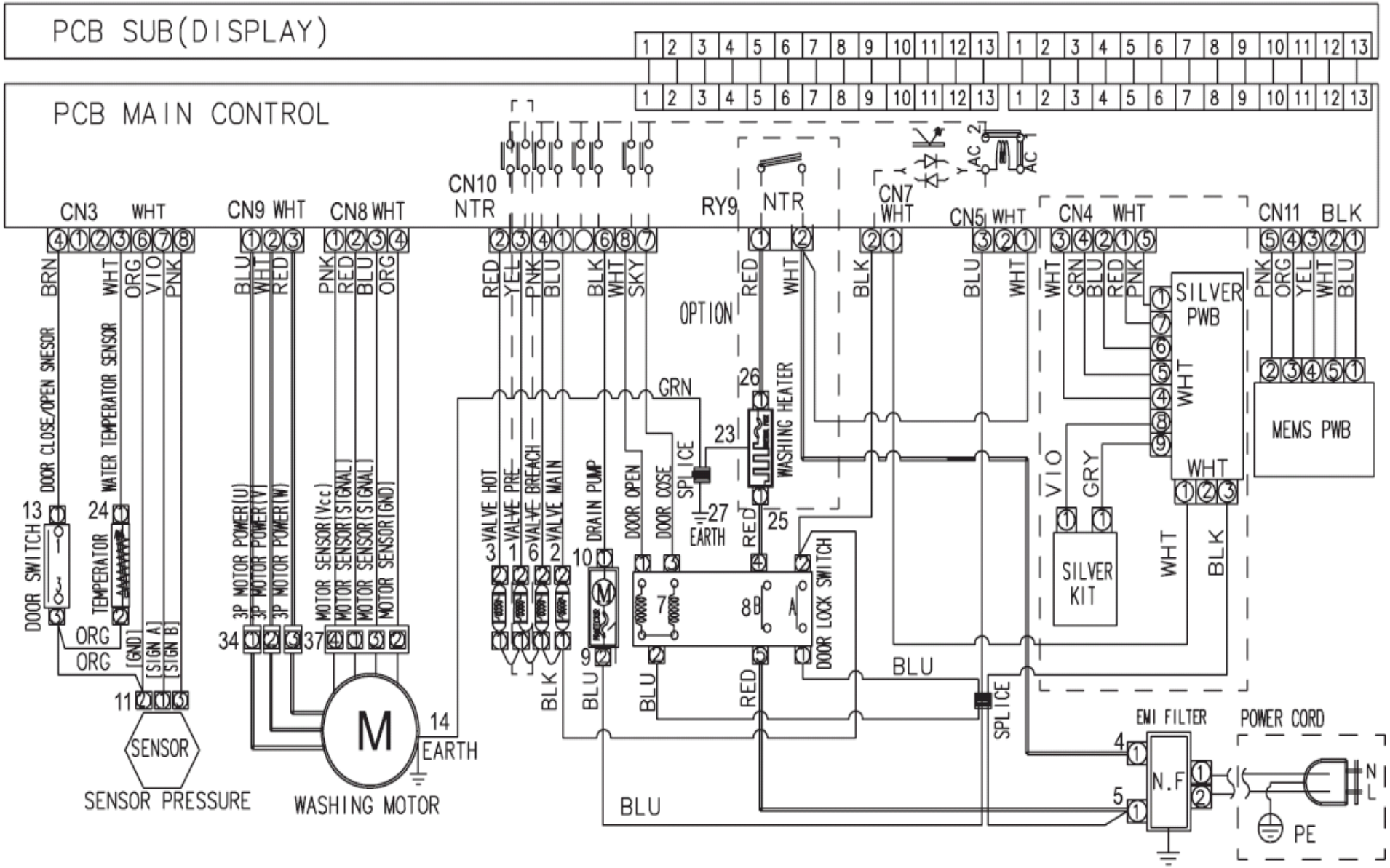
Heater relay Check
Power on, Check voltage at Pins 3(Blu) of CN5 & #1(Red) of RY9 Heater on 120vac & off 0vac.

Non Steam Models

SCHEMATIC DIAGRAM

Special Models

VALVE PRE,HEATER : DELETE->WF306LAW
VALVE PRE : DELETE->WF306BHW
VALVE PRE,HEATER,SILVER KIT/PWB,GUIDE WATER: DELETE->WF206LNW/ANW



WF338 Main PCB located at right rear, remove rear access panel

WF448 Main PCB located at top rear of cabinet

CN3
1 Bleach Valve (Pnk)
2Steam Valve (Red)
2Steam Valve (Brn)WF448
3 Drain Pump (Vio)
4 Door Lock Open (Wht)
5 Door Lock Close (Blk)
6 Circulation Pump(Gry)
7 Pre Valve (Yel)
8 Main Valve (Blu)
9 Hot Valve (Org)
9 Hot Valve (Red)WF448

CN4
1 Door Sw (Pnk)
3 Door Sw (Gry)
7 AG Sensor (Brn)
8 AG Sensor (Yel)

CN7
4 Water Temp Thermistor(Wht)
5 Water Temp Thermistor Gnd. (Org)
6 Water Level Sensor (Pnk)
7 Water Level Sensor (Vio)

CN8 (Display Connector)
1 T Communications Port (Blu)
2 R Communications Port (Wht)
3 Rest Signal (Yel)
4 Ground (Org)
5 +5 vdc (Pnk)
6 +15 vdc (Red)

CN2
1 AC Pwr (L) (Blk)
2 Pwr Sw (Yel)
3 Valves Common, Lock Sw (Brn)
3 Valves Common, Lock Sw (Wht)WF448

CN1
1 Reactor Connector Port (Red) WF448
2 Reactor Connector Port (Red) WF448
1 Reactor Connector Port (Gry) WF338
2 Reactor Connector Port (Gry) Wf338

RY4 Steam Heater Relay
1 (Blk)
1 (Wht)WF448
2 (Org)
2 (Blk) WF448

RY1 Power Relay
1 (Blu)
2 (Wht)

RY2 Washer Heater Relay
1 (Blk)
2 (Red)

CN5
1 Motor Pwr U Phase (Blu)
2 Motor Pwr V Phase (Wht)
3 Motor Pwr W Phase (Red)

CN6 (Hull Sensor)
1 +5 vdc (Pnk)
2 Sensor Signal (Red)
3 Sensor Signal (Blu)
4 Gound (Org)

Chapter 18

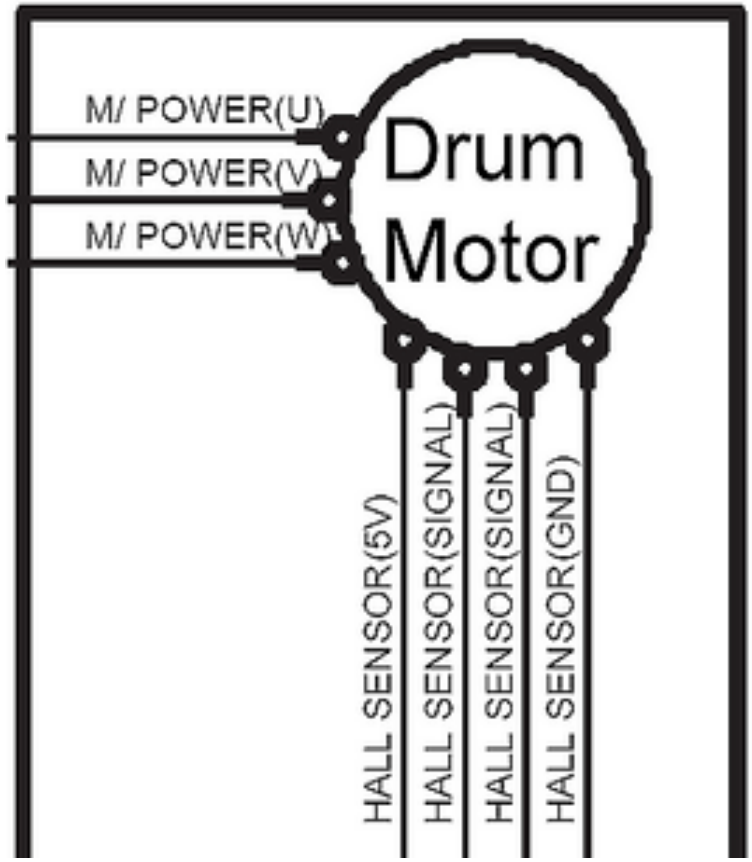
Laundry Disassembly and Testing Procedures

Drum Motor

Operation, troubleshooting and replacement procedure

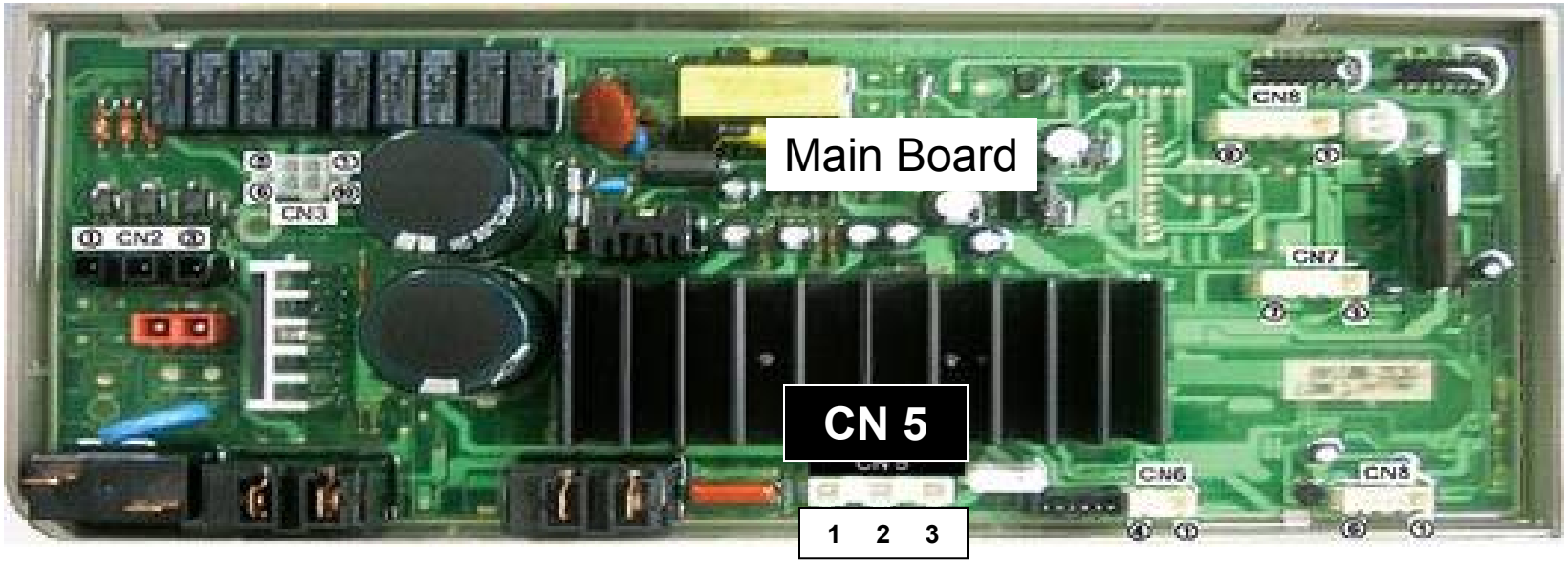
Drum Motor Circuit

Voltage input to motor



Feed back from Hall sensor

Troubleshooting the Drum Motor



The red, white and blue wires go directly from CN5* to the stator of the drum motor.

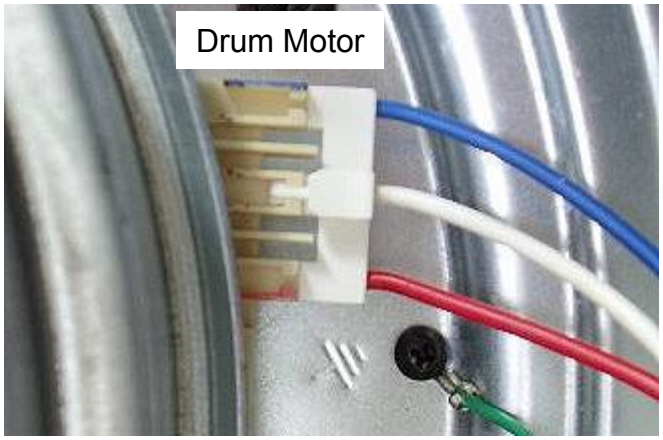
Motor Windings Check:

Resistance at Pin # 1 and # 2 of CN5 =~ 12Ω

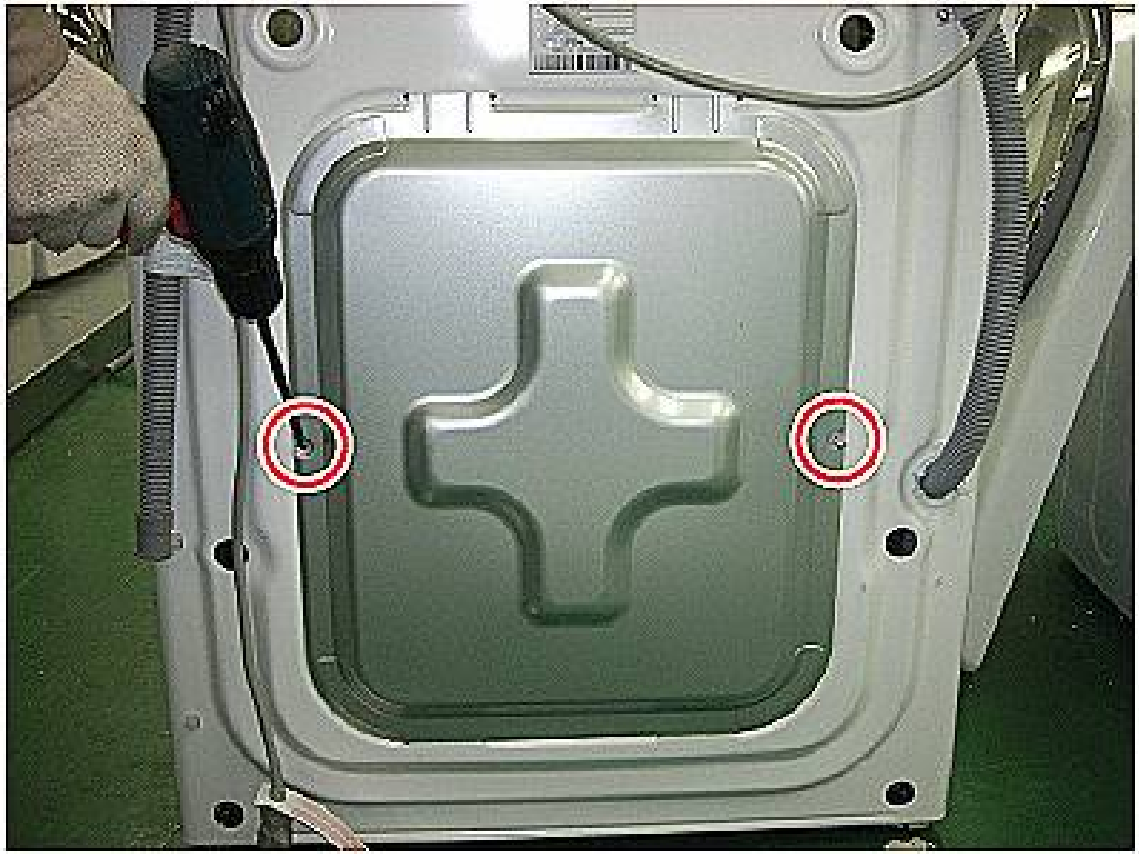
Resistance at Pin # 1 and # 3 of CN5 =~ 12Ω

Resistance at Pin # 2 and # 3 of CN5 =~ 12Ω

*Refer to the service manual for the correct connections for the model being repaired.



Drum Motor Rotor Removal



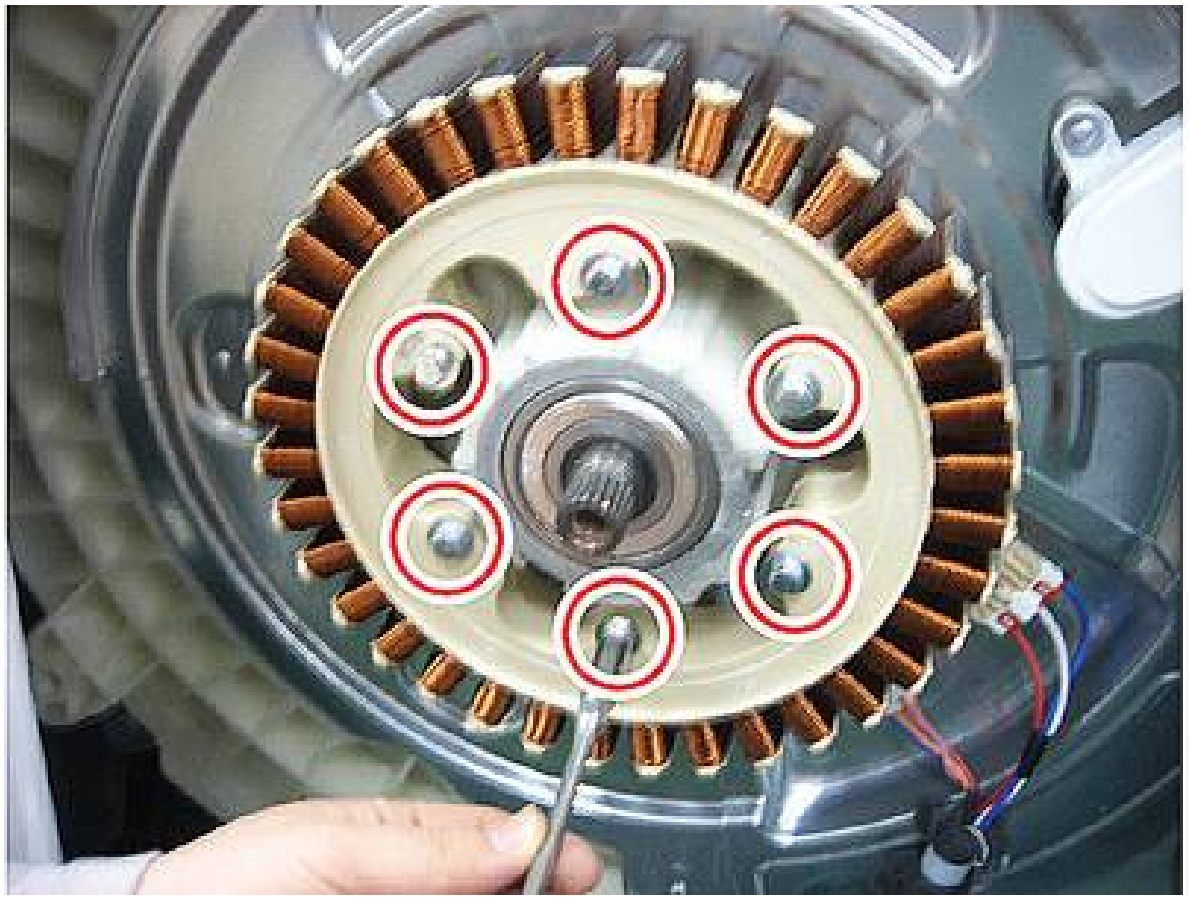
Click the camera to view the video

Remove the rear access panel to uncover the drum motor

Drum Motor Rotor Removal

Carefully slide insert a Philips screw driver into a hole in the rotor and through a stator winding, be careful not to damage the windings.. This will keep the rotor from spinning the drum when loosening the nut. Using a 19mm wrench or socket, remove the retaining nut and washer

Drum Motor Stator Removal



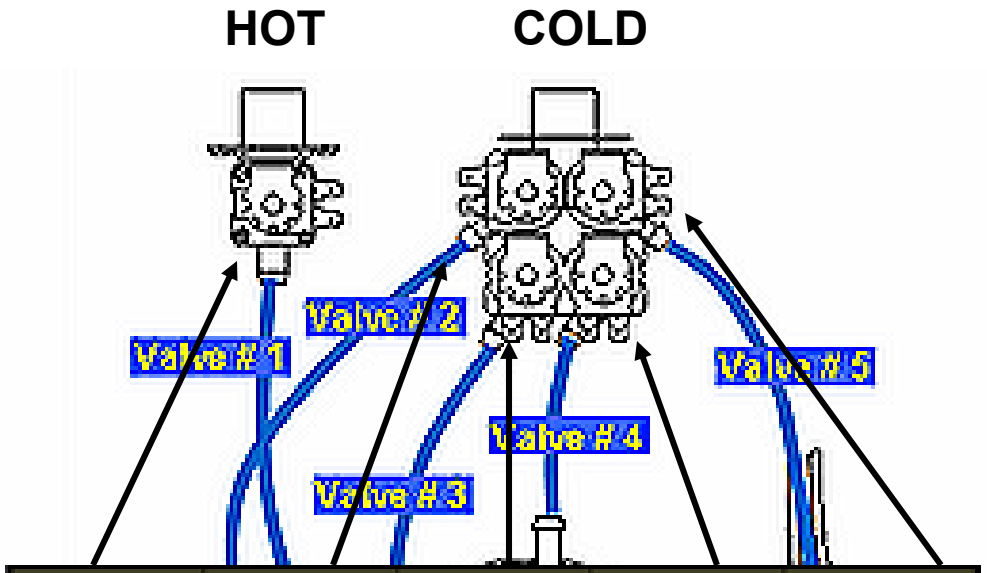
Remove the 6 - 10mm bolts that secure the stator to the rear tub section

Drum Motor Errors

12	bE	Error! Motor is not working properly	25	Motor hall sensor signals come out without motor operation.	Replace Machine Control Board.
14	E3	Error! Motor is not working properly	2E	MICOM is attempting to drive the motor but is not getting any response signals from the hall sensor. Visual check shows motor is not running. (locked, defective hall sensor or overload)	Evaluate wire harness for loose connections. Go to "Quick Test Mode" and test Motor.
17	3E	Error! Motor is not working properly	3E	Over-current is detected. Motor won't turn. (IPM detects over-current.)	Evaluate wire harness for loose connections. Go to "Quick Test Mode" to test Motor.

These represent some typical drum motor errors.
These errors should only be used
as a guide to a problem and not an exact diagnosis.

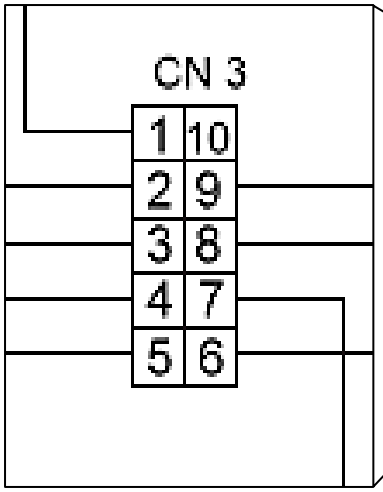
Water Valves

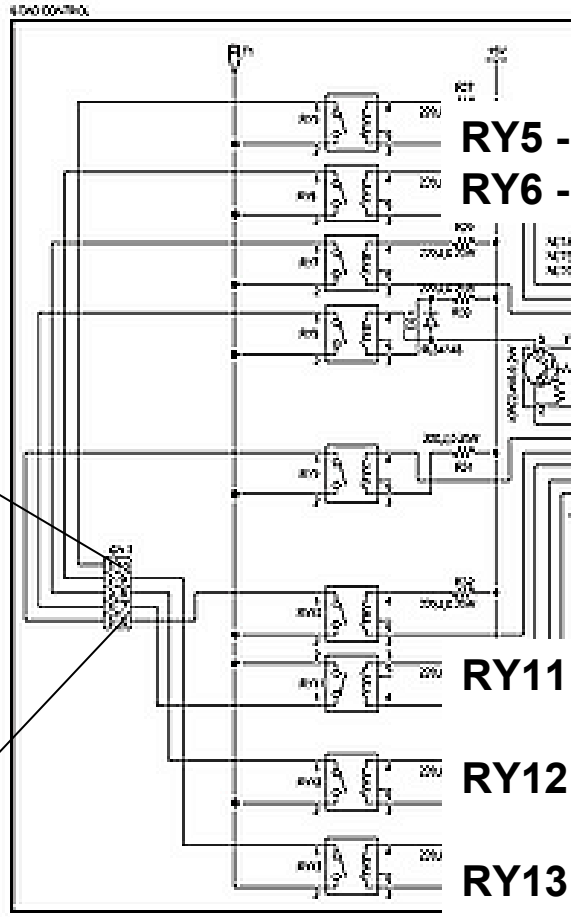


V#1	V#2	V#3	V#4	V#5
MAIN (H)	PRE WASH	BLEACH	MAIN(C)	STEAM

Water Valve Relay Circuit

CN 3 pin 1 - Pink wire - Bleach valve
CN 3 pin 2 - Brown wire - Steam valve
CN 3 pin 7 - Yellow wire - Pre wash valve
CN 3 pin 8 - Blue wire - Main cold valve
CN 3 pin 9 - Red wire - Main hot valve





RY5 - Bleach water valve
RY6 - Steam water valve

RY11 - Pre wash water valve

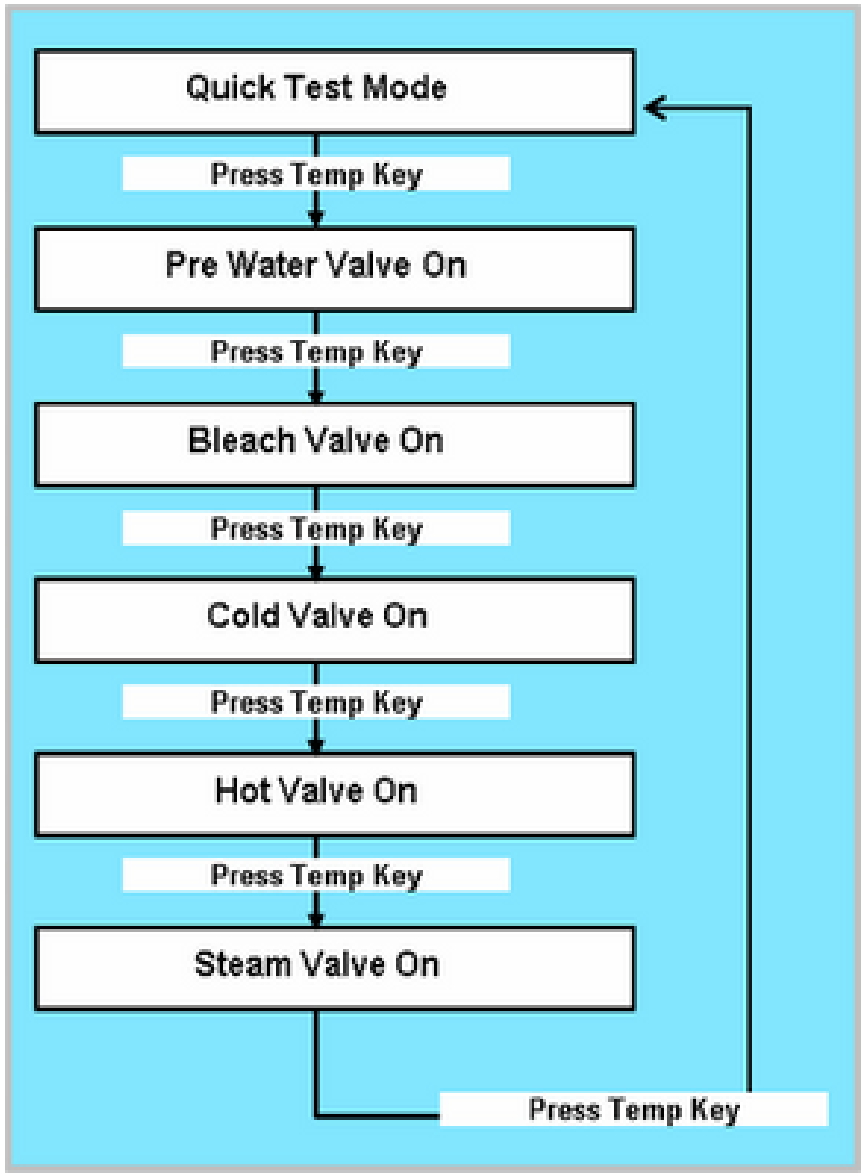
RY12 - Main cold water valve

RY13 - Main hot water valve

The output voltage to the water valves is 120VAC

Checking the Water Valves

Enter into the "Quick Test" mode and press the “Temp” button



Testing the Water Valves

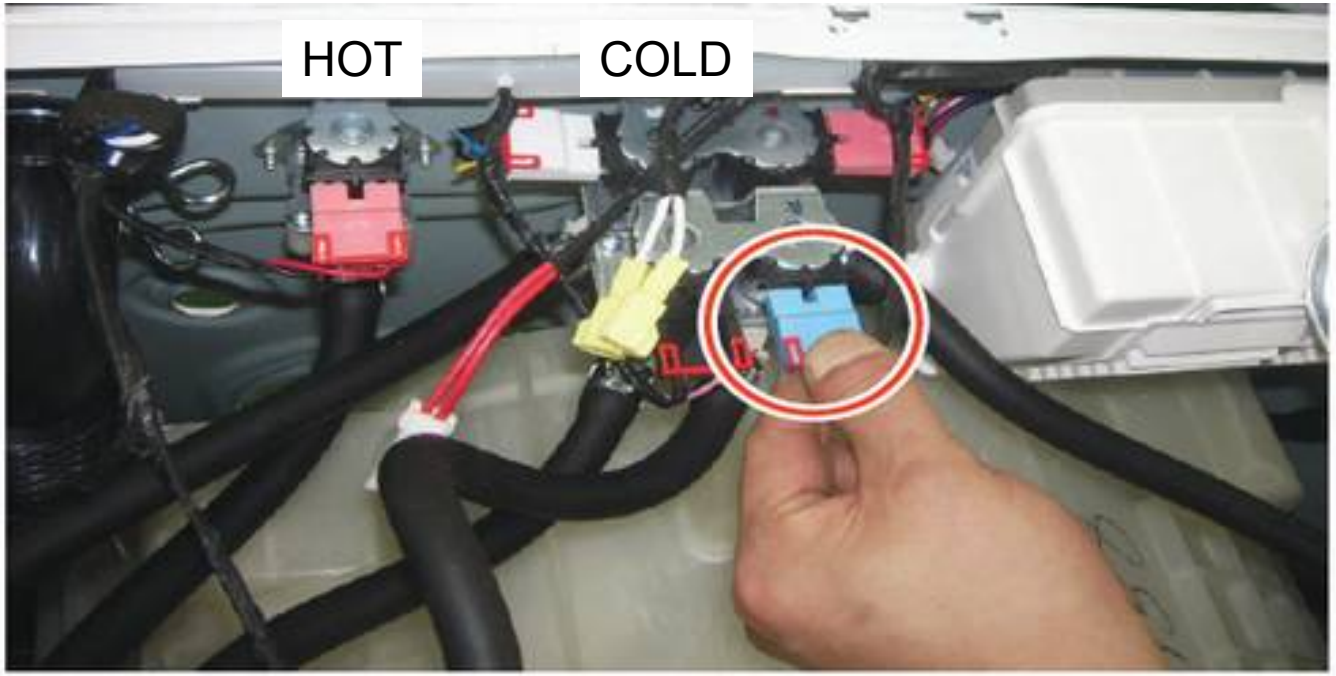
Water Valve Check

Check the Voltage at Pin #1 of CN2 and Pin #1, 2, 7, 8 and 9 of CN3

When each valve operates the measured voltage is 120VAC

When checking the resistance of the water valve solenoids they should all measure between 1205-1245 Ω

Replacing the Water Valves

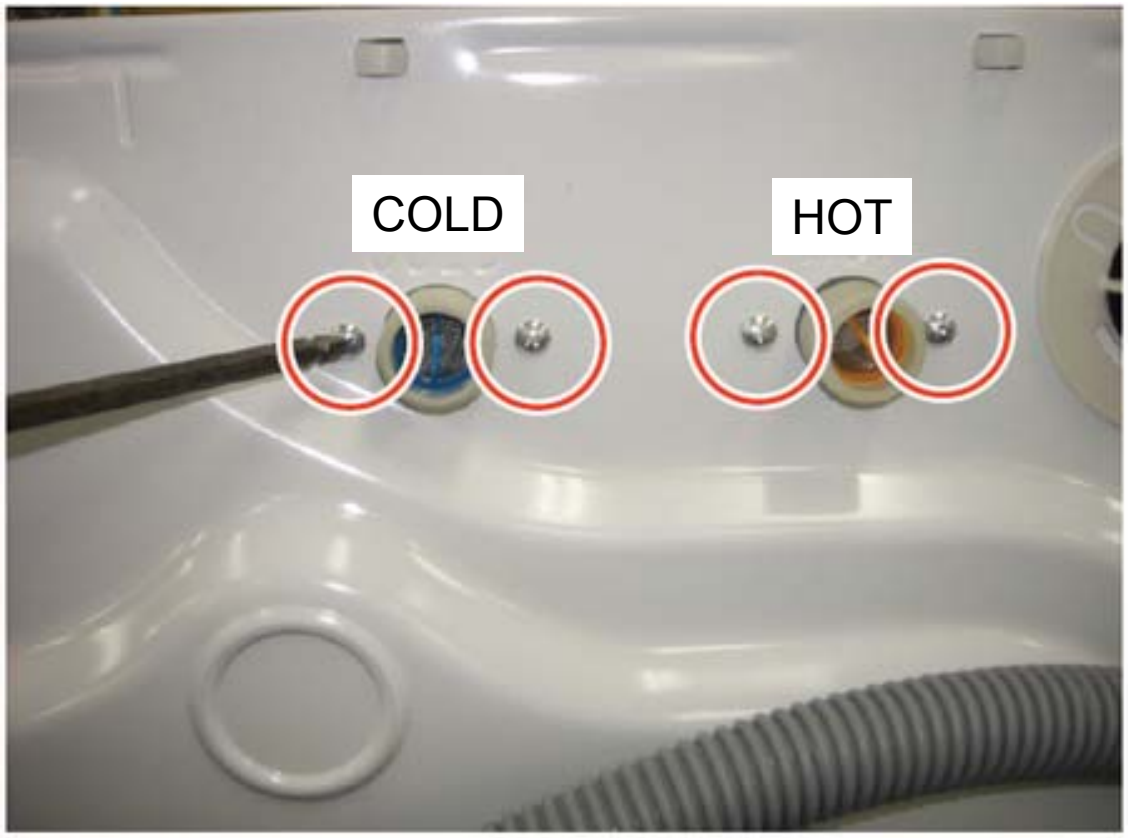


Click the camera to view the video

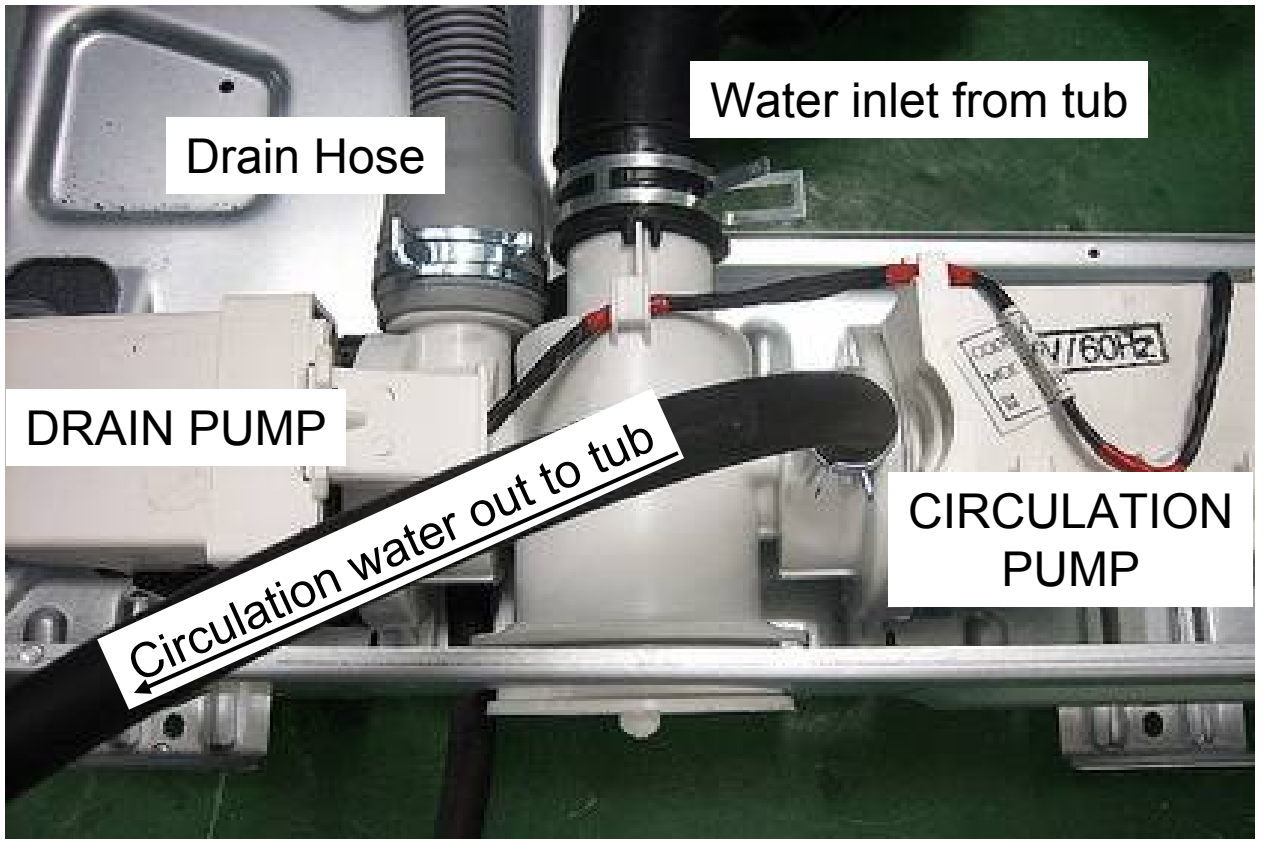
The hot water valve is a single valve and the cold valve is a quad valve

*NOTE: On other models this will be a 3 way cold water valve but the removal procedure is the same

Replacing the Water Valves

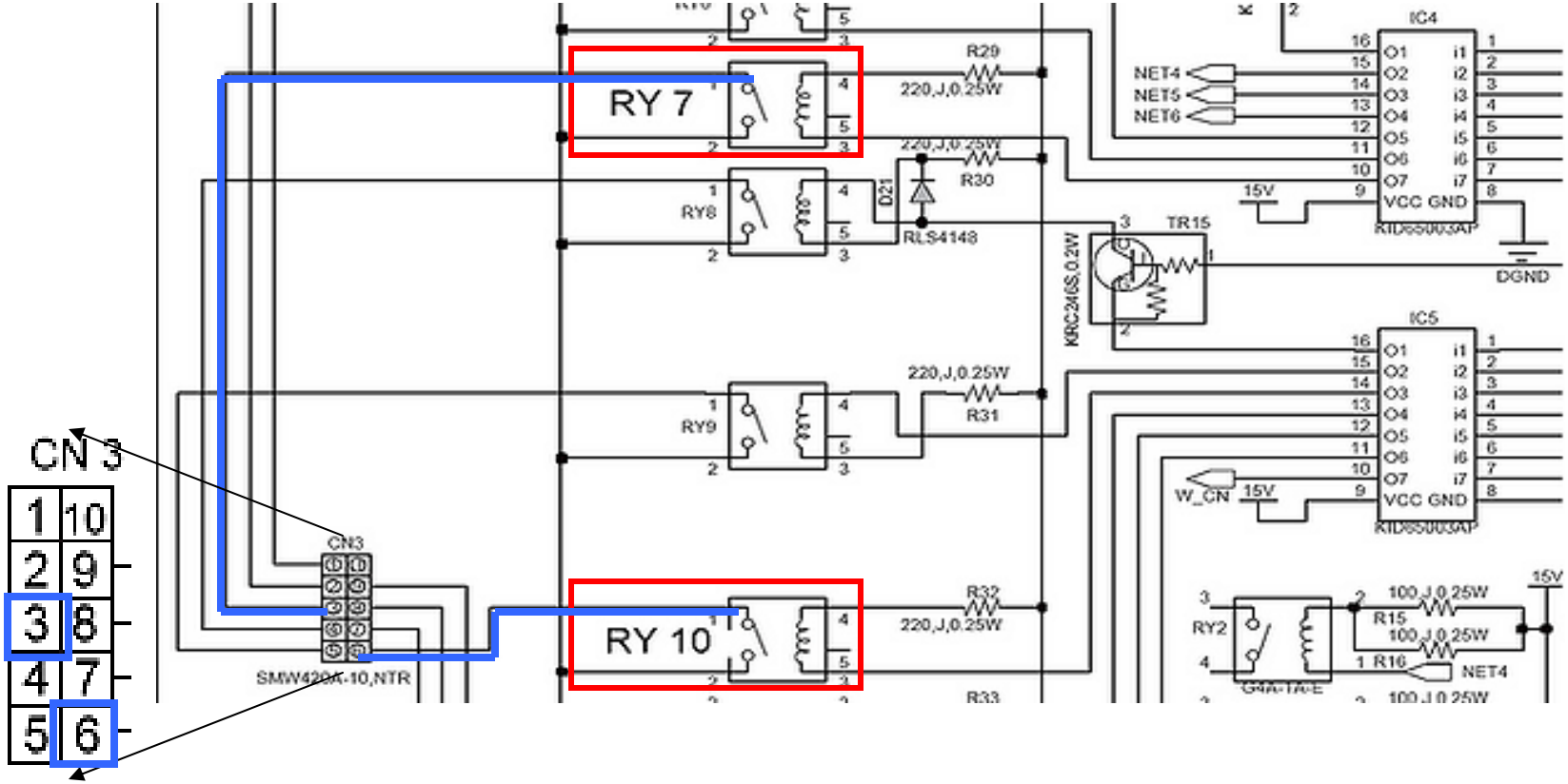


Drain and Circulation Pump



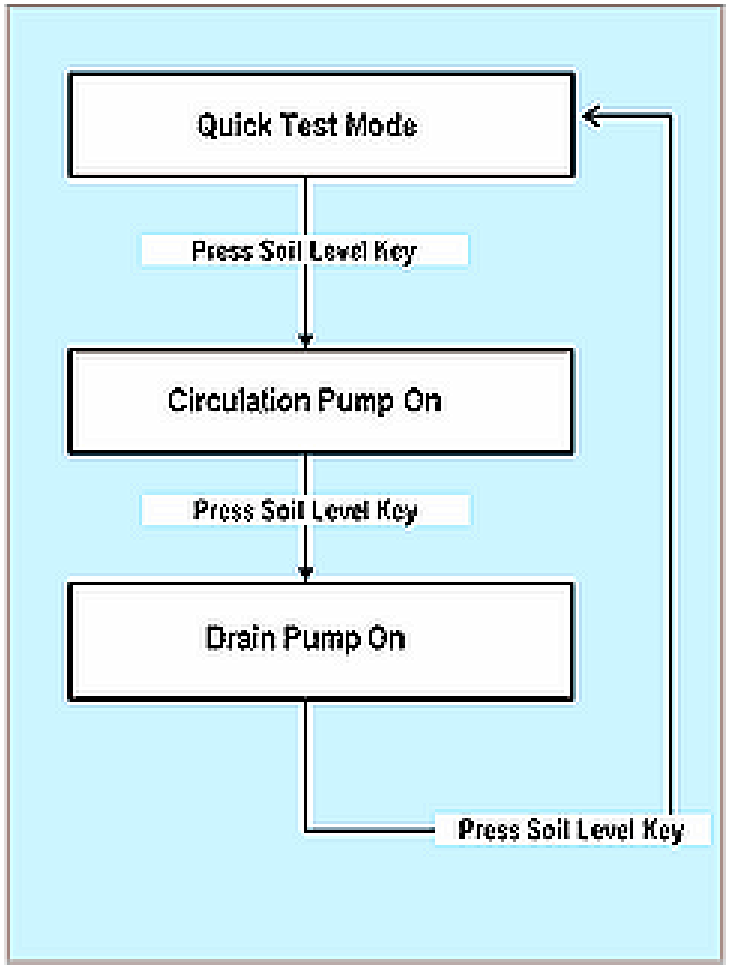
Drain pump and circulation pump operation, troubleshooting and diagnosis and replacement

Drain and Circulation Pump Circuit



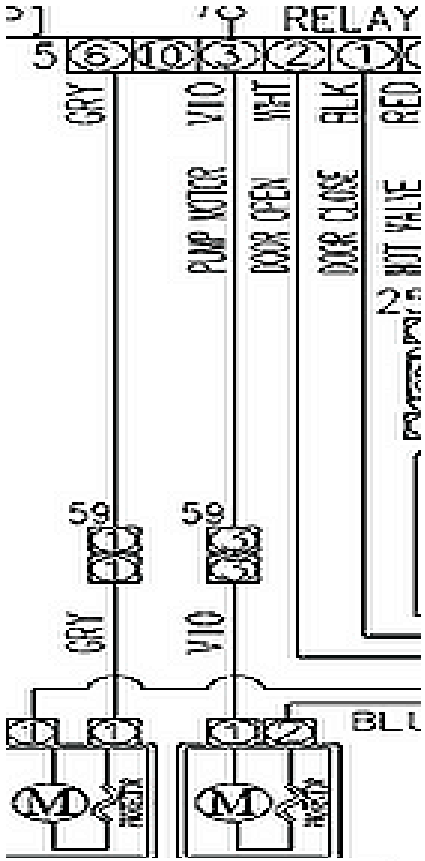
RY 7 controls the drain pump and RY 10 controls the circulation pump

Troubleshooting the Drain and Circulation Pumps



To check the Drain Pump operation, press the Soil Level Key while model information is being displayed during the Quick Test Mode.

Troubleshooting the Drain and Circulation Pumps



Circulation Drain

Drain Motor Check

Check the voltage at Pin # 1 (common blue wire) of CN2 and Pin # 3 (violet wire) of CN3

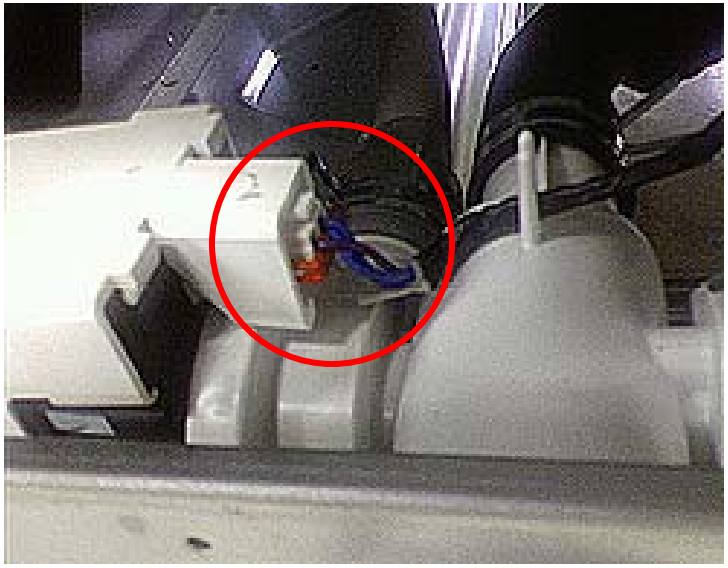
When Drain Motor operates = AC 120V

Circulation Motor Check

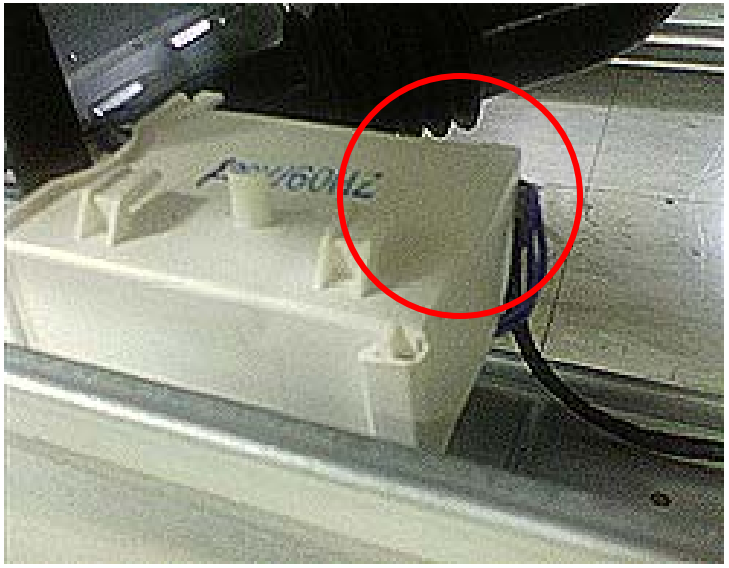
Check the voltage at Pin # 1 (common blue wire) of CN2 and Pin # 6 (gray wire) of CN3

When Circulation Motor operates = AC 120V

Troubleshooting the Drain and Circulation Pumps

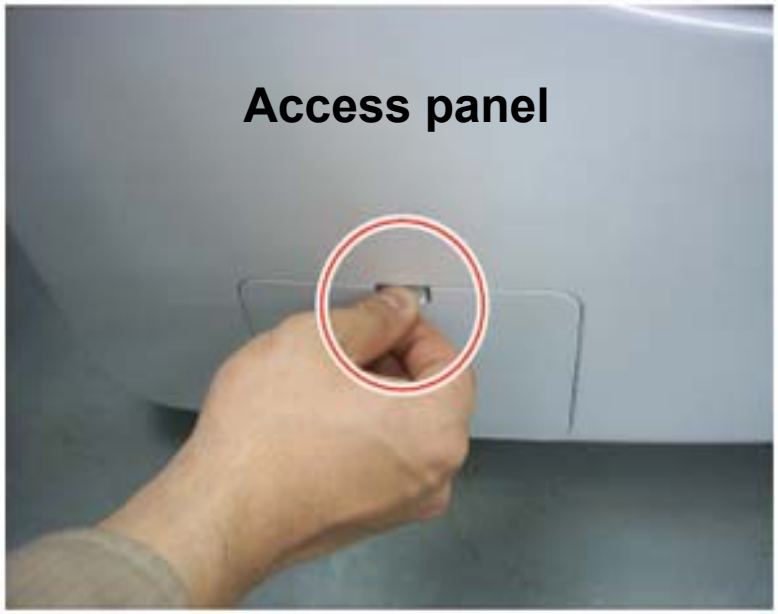


Remove the connector and read the resistance at the terminals on the Drain Pump: Should be ~14 Ω



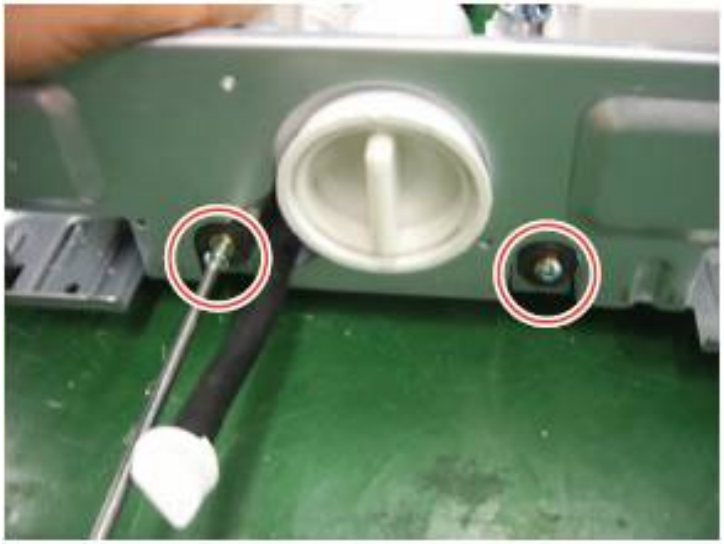
Remove the connector read the resistance at the terminals on the Circulation Pump: Should be ~28 Ω

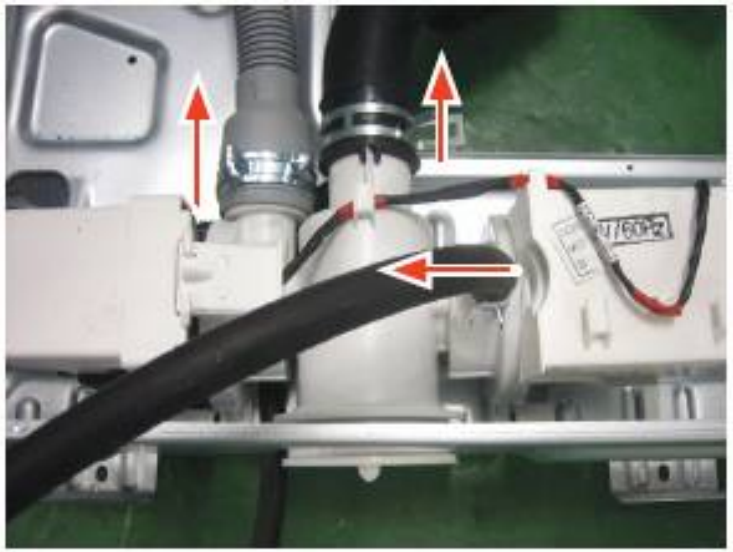
Removing the Drain and Circulation Pumps



Remove the front access panel to the pump clean out filter and drain the excess water.

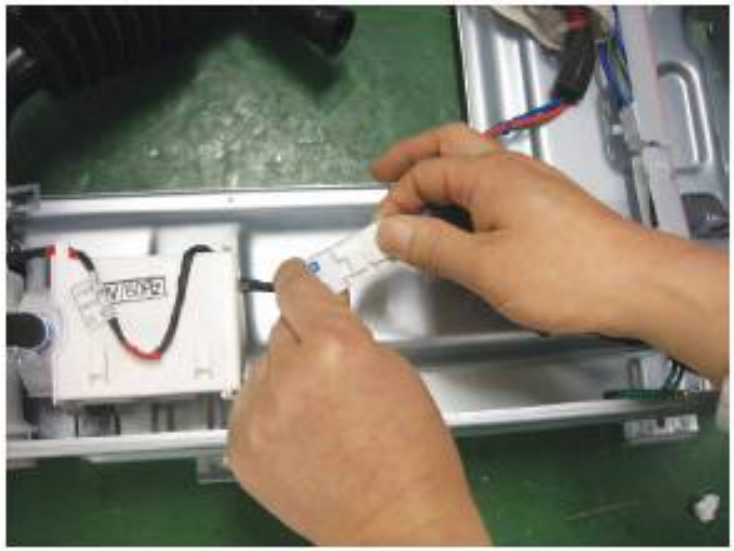
Removing the Drain and Circulation Pumps

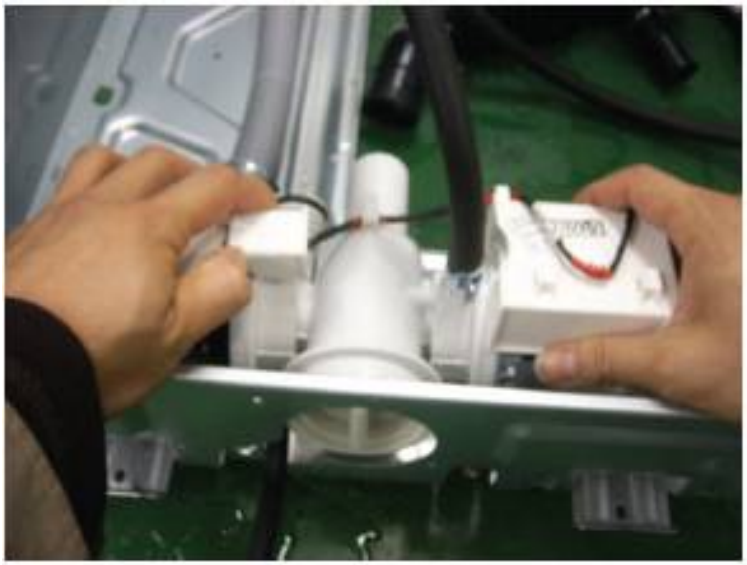




With the front panel of the machine removed, remove the 2 screws that hold the pump assembly in place and remove the hoses in the direction of the arrows.

Removing the Drain and Circulation Pumps



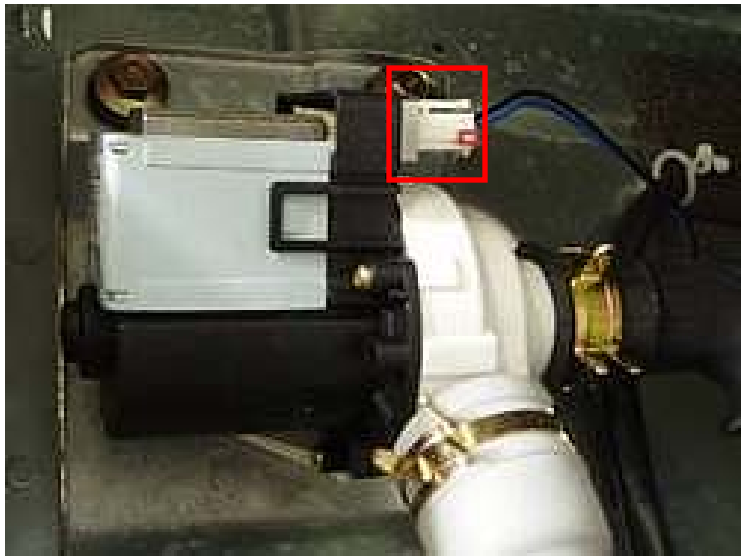


Disconnect the wiring harness connectors to the drain and circulation pump sections and remove both as an assembly. Install the new pump following the reverse order of this procedure.

Models with Drain Pump Only

1. Unplug the unit.
2. Remove Back Cover.
3. Remove the wire connector.
4. Remove Clamp and Drain Hose.
5. Remove Clamp and Pump Hose.
6. Remove the bolts (3 - 13mm) securing Drain Pump to Cabinet Bottom.
7. Remove the screw securing Drain Pump to the support bracket. Twist Drain Pump clockwise to remove.

** Make sure to put an empty container under Drain Pump to catch the water still inside the pump.



Remove the connector and read the resistance at the terminals on the Drain Pump: Should be ~14 Ω

Click the camera to view the video

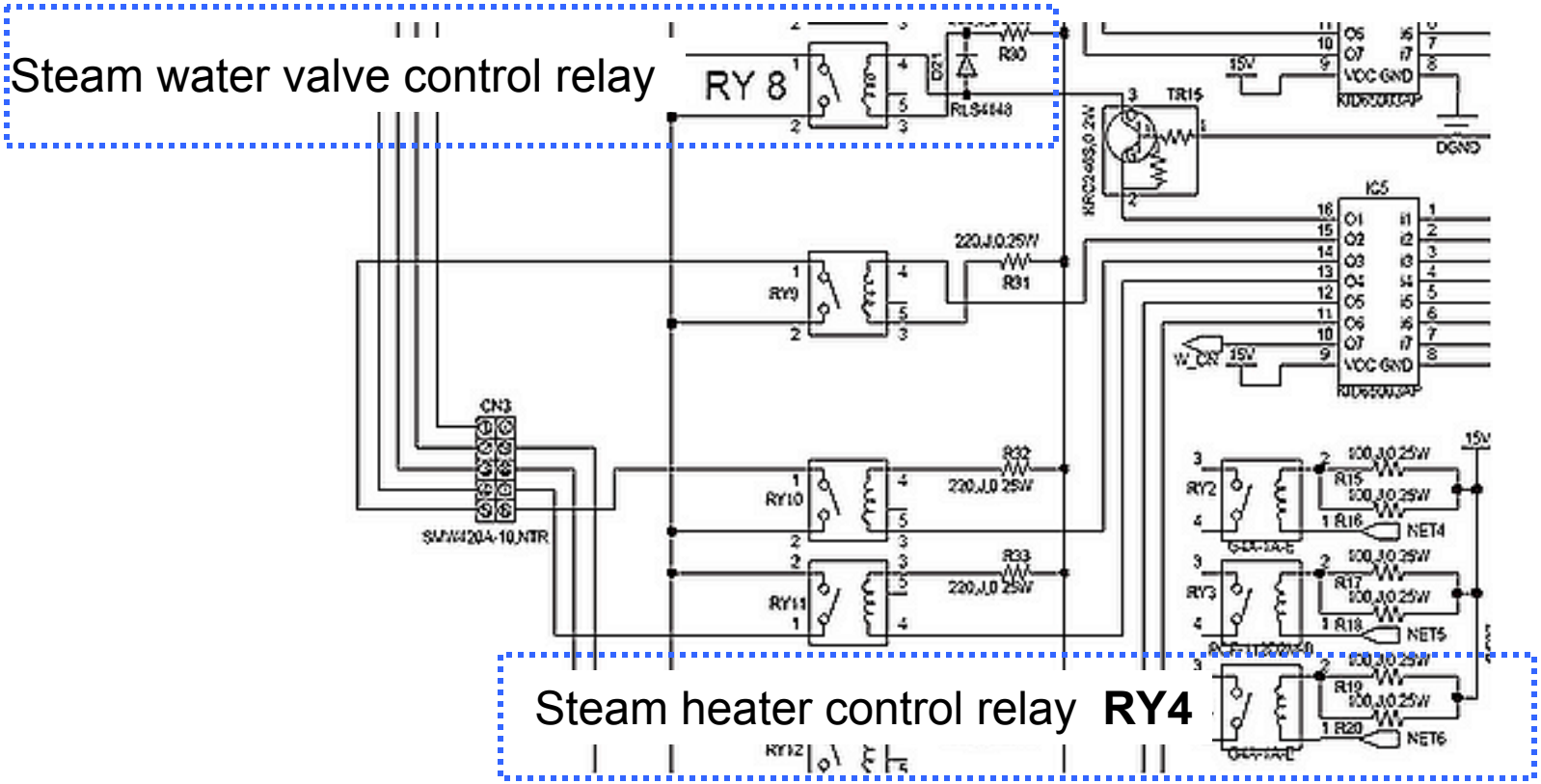
Drain Pump Error

1	nd	Error! No Draining	1	The water level fails to drop below the Reset Water Level within 15 minutes.	Go to "Will Not Drain" Troubleshooting Section.

This is a typical error indicating a drain error but not necessarily a drain pump error. Items that should be checked to correct drain errors are:

- Connections
- 120VAC from the main board to the pump motor
- Pump motor resistance
- Restriction in the pump or drain hose

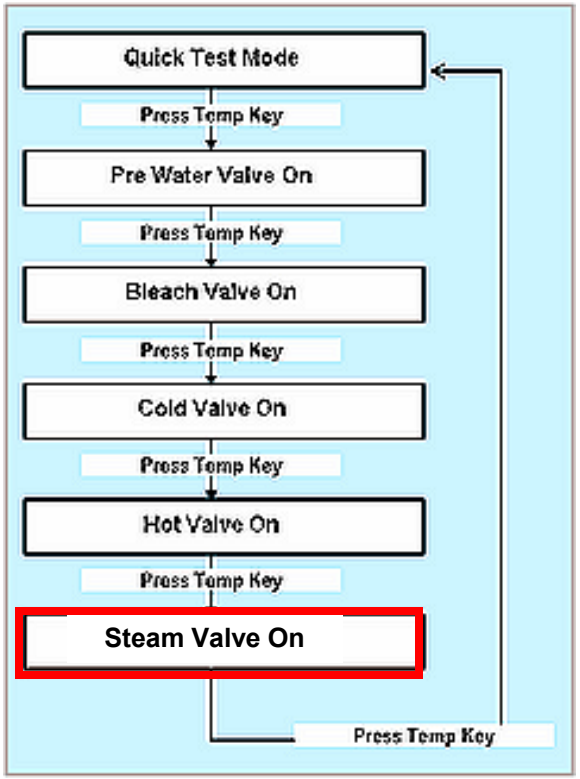
Steam Troubleshooting



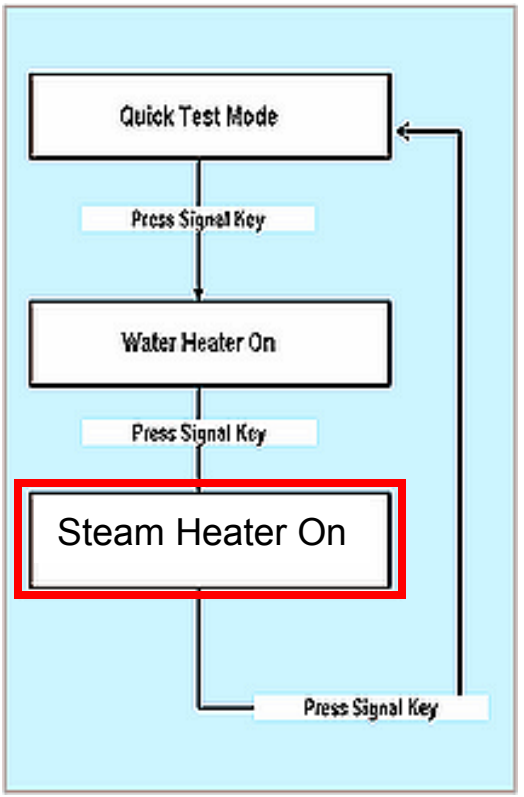
The steam feature consists of two major components. A cold water valve dedicated to the steam and a heater to create the steam

Checking the Steam Water Valve and Heater

Water Valve Test

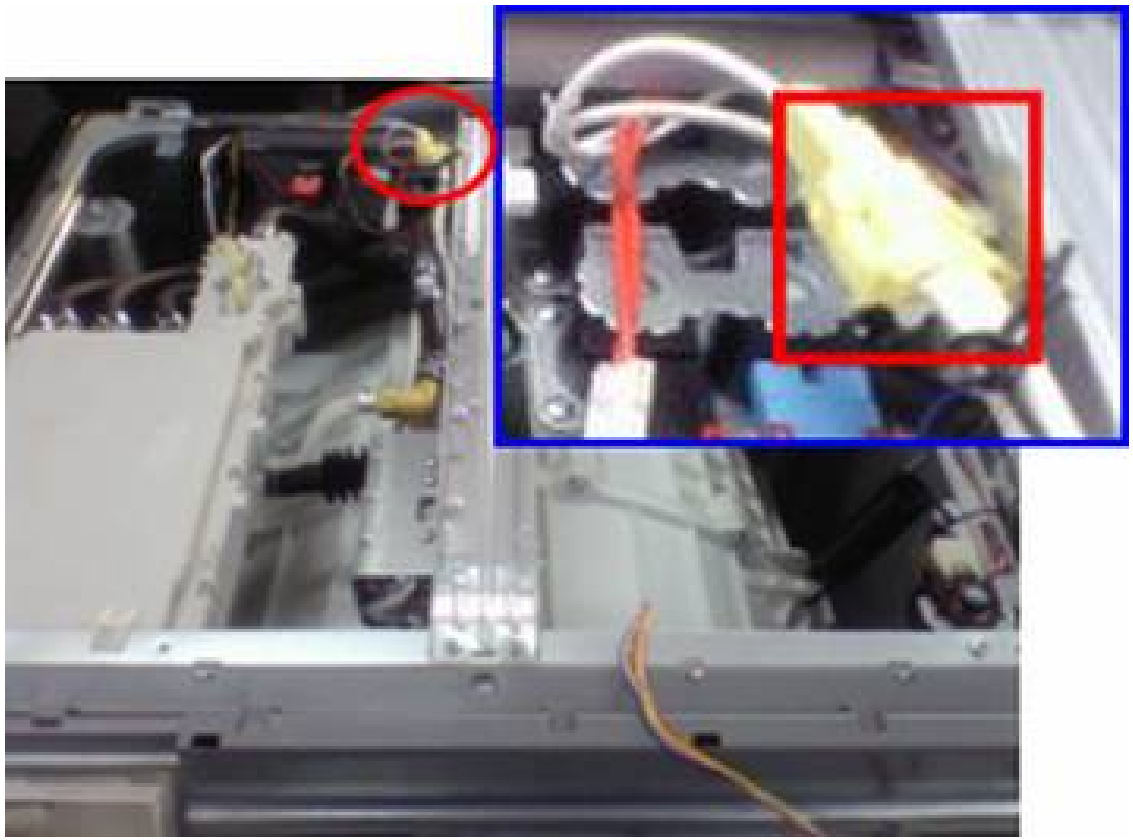


Heater Test



Both the water valve and the heater for the steam feature can be turned on in the quick test mode to test. For the steam heater you will hear the relay click on and off.

Troubleshooting the Steam System

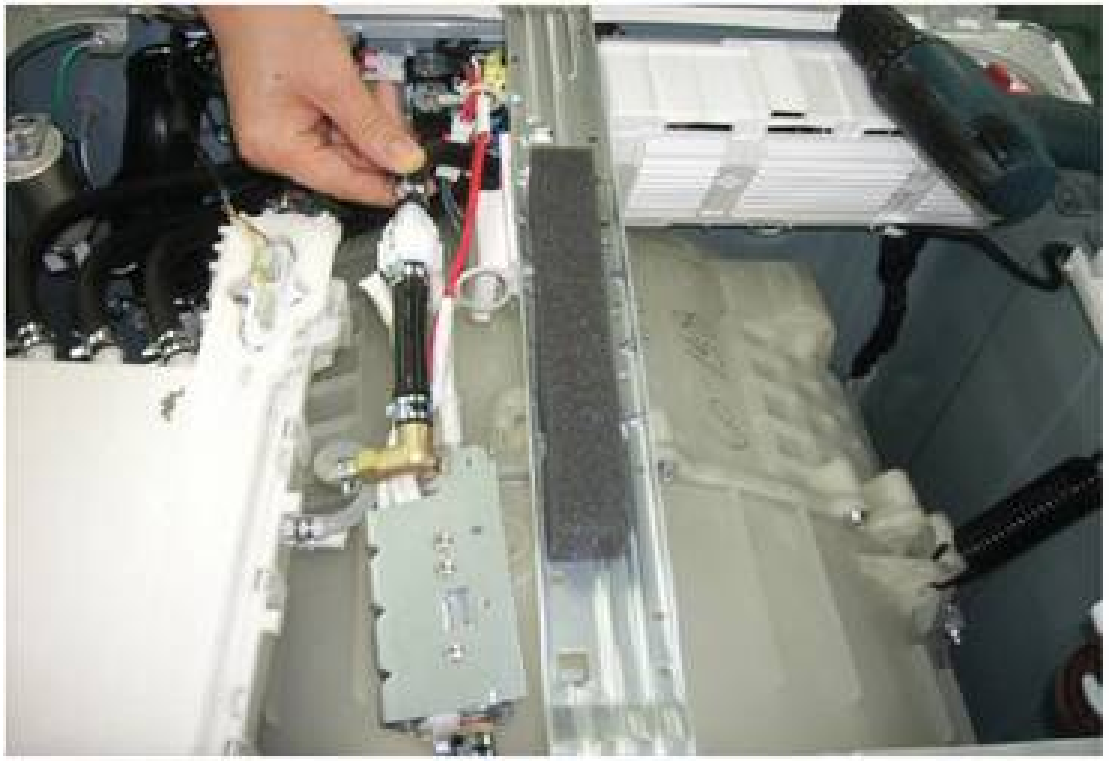


Remove the connector and read the resistance at the terminals on the Steam heater: Should measure ~ 16 Ω

Removing the Steam Heat Element

Remove the screws that secure the steam unit to the frame of the machine

Replacing the Steam Heat Element



With the screws removed, disconnect the wiring harness and water lines to the steam unit and remove. Reverse the procedure to install the new steam unit.

Chapter 19

Laundry Service Bulletins, Service Tips and Suggested Truck Stock

Sample Service Bulletins

Category	Home Appliances / Washing Machine / Washing Machine
Model Code	WF337AAG/XAA,WF337AAL/XAA,WF337AAR/XAA,WF337AAW/XAA
Title	ASC20071121001 Water Leakage due to a split in the Hose Drawer
ASC20071121001 Water Leakage due to a split in the Hose Drawer	
Added by	SEA PRODUCT SUPPORT
Added on	11/21/2007 15:03:10
E-mail	technicalsupport@sea.samsung.com
Bulletin	
Mileage	100 Miles
Attach	Download File ☑ Select all

☐ ASC20071121001.pdf (77KB)

Category	Home Appliances / Washing Machine / Washing Machine
Model Code	WF317AAG/XAA,WF317AAS/XAA,WF317AAW/XAA,WF337AAG/XAA,WF337AAL/XAA,W...
Title	ASC20071017001 Part code changes for Water Hose Assembly.
ASC20071017001 Part code changes for Water Hose Assembly.	
Added by	SEA PRODUCT SUPPORT
Added on	10/17/2007 16:00:45
E-mail	technicalsupport@sea.samsung.com
Bulletin	
Mileage	100 Miles
Attach	Download File ☑ Select all

☐ ASC20071017001.pdf (89KB)

Category	Home Appliances / Washing Machine / Washing Machine
Model Code	WF337AAG/XAA,WF337AAL/XAA,WF337AAR/XAA,WF337AAW/XAA
Title	ASC20071018001 Water Leakage when SilverCare is selected (with high water pressure)
ASC20071018001 Water Leakage when SilverCare is selected (with high water pressure)	
Added by	SEA PRODUCT SUPPORT
Added on	10/18/2007 10:20:36
E-mail	technicalsupport@sea.samsung.com
Bulletin	
Mileage	100 Miles
Attach	Download File ☑ Select all

☐ ASC20071018001.pdf (79KB)

These files can be down loaded from GSPN the service web site

Sample Service Tips

Category	Home Appliances / Washing Machine / Washing Machine
Model Code	WF328AAW/XAA,WF326LAS/XAA,WF326LAW/XAA,WF306BHW/XAA,WF306LAW/XAA,...
Title	3E Drum Motor Error

Normally this error will send the tech to the quick test mode to try to spin the motor forward and reverse at a very slow speed (under 100 RPM). However this test is not always conclusive. Shown here is a case where the motor breaks down only in the high speed test where the motor reaches as high as 800 RPM, then draws too much current. A resistance test will show what seems to be a normal motor. However on closer inspection the following was discovered. Each terminal, from either end to center or end to end should read the same resistance:
Motor Check from the Main PCB
Pin #1 and #2 of CN9 =12.8Ω
Pin #1 and #3 of CN9 =11.6Ω
Pin #2 and #3 of CN9 =11.6Ω
As these readings indicate there is a slight short, possibly 1 or 2 windings, in the stator which is why the motor will spin at a slow speed and not give any indication of problems but will break down at high speed. However further inpection revealed a poor connection at the motor connector

REPAIR: Check motor stator connection

These files are not down loadable from GSPN

Category	Home Appliances / Washing Machine / Washing Machine
Model Code	WF337AAG/XAA,WF337AAL/XAA,WF337AAR/XAA,WF337AAW/XAA
Title	Some buttons dont work. The power and start/pause buttons push levers to activate the board.

Symptom
Some front buttons dont work

Solution
Check actuator levers ----see the picture attached.

The power and start/pause buttons push levers to activate the board.

If they do not work it is most likely a panel problem not a board problem

Category	Home Appliances / Washing Machine / Washing Machine
Model Code	WF328AAW/XAA,WF326LAS/XAA,WF338AAB/XAA,WF203ANW/XAA,WF206ANS/XAA,...
Title	NF CODE DURING FILL TIME

SYMPTOM
UNIT DISPLAYS A NF CODE DURING FILL TIME

CURE
CUSTOMER WAS ON A WATER WELL AND DURING THE FILL TIME THE WATER PRESSURE WOULD DROP DOWN BEFORE THE WELL PUMP WOULD TURN ON AND THE WATER LEVEL PRESSURE SWITCH WOULD DISPLAY A NF CODE...THE PUMP TURN ON NEEDED TO BE RE-ADJUSTED TO TURN ON AT A HIGHER PRESSURE..
THERE IS NO PROBLEM WITH THE WASHER...

Laundry Truck Stock Recommendations Part 1

- **The recommended truck stock items list updated bi- monthly please check the TechTalk Newsletter for the most updated listing**

( ) Stock Quantity Laundry
(1) DC96-01414A Washer Pump Ass'y - Many Models
(2) DC31-00054A PUMP-DRAIN - Many Models
(1) DC64-00802A Washer Door-Boot - WF206, 218, 306, 316, 317, 328, 337
(1) DC97-03716C Washer Ass'y-Sensor Water Pressure - Many Models
(1) DC64-00519B Washer Door Lock Switch – Many Models
(4) DC97-12560A Washer Ass'y Leg - Many Models
(1) DC97-10417A (Silver Care water tank) Ass'y-Guide Water Silver Care Models only
(1) DC67-00051B Washer Hose - Valve to Detergent Box
(1) DC97-07125M Washer ASSY-HOUSING DRAWER WF317, WF328, WF337
(1) DC62-30314K Washer Hot Water Valve
(1) DC62-30312J Washer Cold Water Valve (2 valves) WF203ANW, WF206, WF218
(1) DC62-00142G Washer Cold Water Valve (3 valves - pre-wash) WF316, WF317, WF337
(1) DC62-00214L Washer Cold Water Valve (4 valve - pre wash, steam) WF338, WF448
(1) DC31-00049A Washer MOTOR Ass'y
(1) MES-AG3MOD-S2 Washer SilverCare PCB WF306, 316, 317, 328, 337

Laundry Truck Stock Recommendations Part 2

- **The recommended truck stock items list updated bi-monthly please check the TechTalk Newsletter for the most updated listing**

WASHER PART NUMBER INFORMATION, water temperature sensor (Thermistor)
(1) DC90-10128H ASS'Y-THERMISTOR WF203, 218, 328, 337, 338, 438, 448 Heater in front Sensor in back,
(1) DC32-00010A Description: THERMISTOR WF206, WF306LAW - Without water heater
(2) DC47-00006G Description: ASS'Y – HEATER WF306BHW, WF316 With water heater
(1) DC90-10128L ASS'Y-THERMISTOR WF317 Heater in front Sensor in back, Description:
(1) 6602-001314 Dryer Belt
(1) DC96-01188A Dryer Electric Terminal Block
(1) DC31-00055A Dryer Motor
(1) DC47-00022A Gas Dryer Igniter
(1) DC62-00201A Gas Dryer Valve
(1) DC32-00007A Dryer Thermistor
(1) DC97-08889A Dryers Moisture Sensor Assembly
(1) DC47-00016A Dryer Thermostat
(1) DC47-00017A Dryer Gas Thermostat
(1) DC47-00015A Dryer Electric Thermostat
(1) DC47-00018A Dryer Electric Thermostat

Chapter 20

Dryer Installation

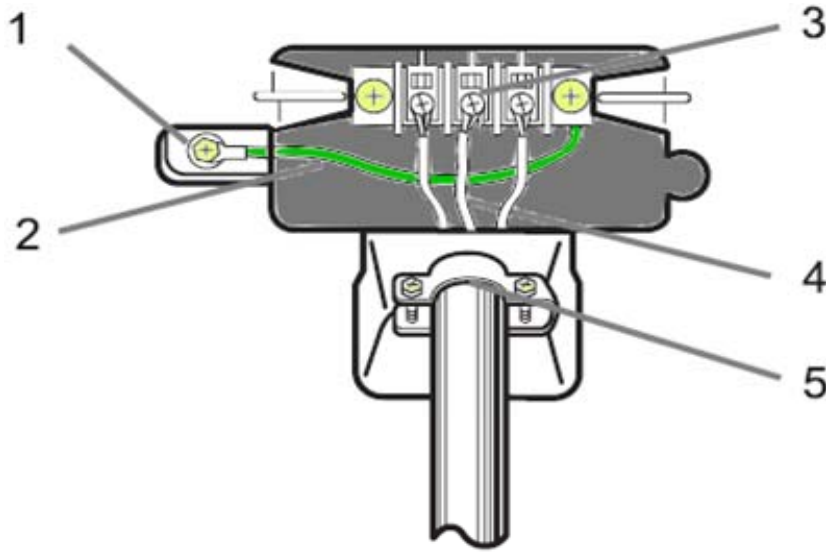
For additional installation details see the accompanying 2008 Installation DVD

Obey State and Local Laws

"According to certain state and/or local requirements, gas dryers may only be installed by a **licensed plumber**"

"According to certain state and/or local requirements, electric dryers may only be installed by a **licensed electrician**"

Dryer Wiring 3 Wire Connection

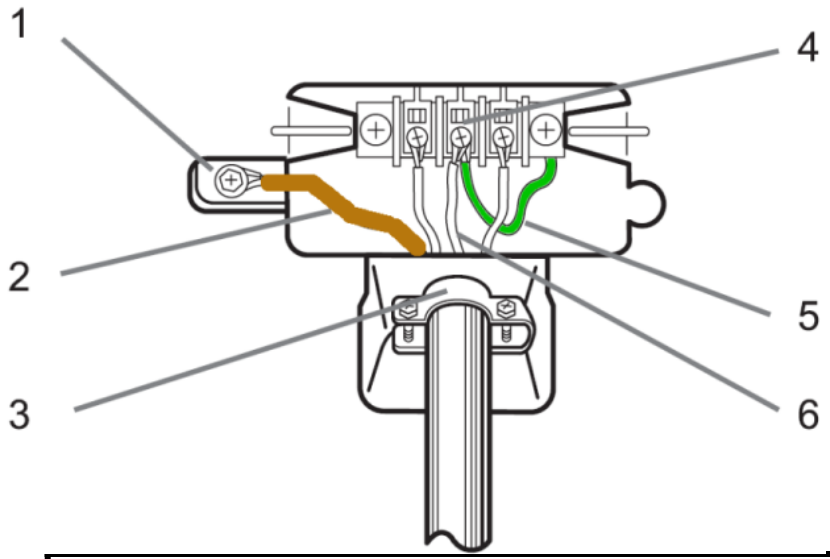


1. External Ground connector
2. Neutral Grounding wire (green/yellow)
3. Center silver colored terminal block screw
4. Neutral wire (white or center wire)
5. ¾” (1.9cm UL Listed strain relief)

1. Loosen the center terminal block screw
2. Connect the neutral wire (White or center wire) of the power cord to the terminal screw of the terminal block and tighten it.
3. Connect the other wires to the outer terminal block screws and tighten them
4. Tighten the strain relief screws
5. Insert the tab of the terminal block cover into the rear panel slot and secure it with the hold down screw.

Note: If you are converting from a 4-wire electrical system to a 3-wire, the ground strap must be reconnected to the terminal block to ground the dryer frame to the neutral conductor.

Dryer Wiring 4 Wire Connection



1. External ground connector
2. Green or bare copper wire of power supply cord
3. 3/4 in. (1.9 cm) UL-listed strain relief
4. Center silver-colored terminal block screw
5. Grounding wire (green/yellow)
6. Neutral wire (white or center wire)

1. Remove the center terminal block screw.
2. Connect the ground wire (green or bare) of power supply cord to external ground conductor screw.
3. Connect the neutral wire (white or center wire) of power supply cord and appliance ground wire (green with yellow stripes) under central screw of the terminal block.
4. Connect the other wires to outer terminal block screws and tighten the screws.
5. Tighten the strain relief screws.
6. Insert the tab of terminal block cover into the slot of dryer rear panel. Secure the cover with the hold-down screw.

Dryer Gas Connection Information

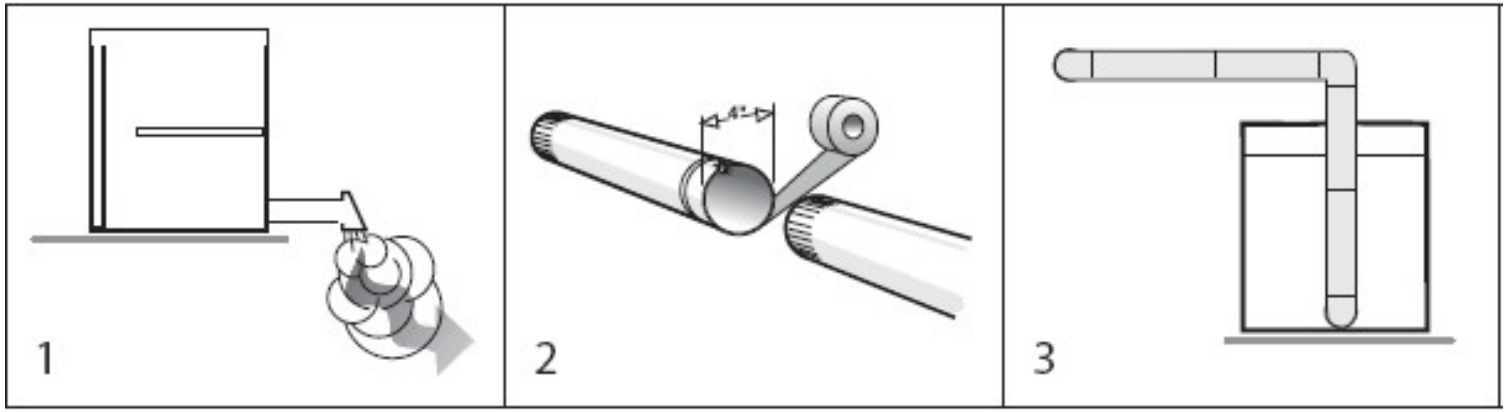
- This gas dryer should be installed by a licensed plumber or gas fitter.
- Use only Natural or LP (liquid propane) gases.
- **THE INSTALLATION MUST CONFORM WITH LOCAL CODES, OR IN THE ABSENCE OF LOCAL CODES, WITH THE NATIONAL FUEL GAS CODE ANSI/Z223.1, LATEST REVISION (FOR THE UNITED STATES), OR WITH THE CAN/CGA-B149 INSTALLATION CODES (FOR CANADA).**
- Gas dryers are equipped with a burner orifice for operation on NATURAL gas. If the dryer is to be operated on LP (liquid propane) gas, it must be converted for safe and proper performance and must be converted by a qualified service technician.
- A 1/2” (1.27 cm) gas supply line is recommended and must be reduced to connect to the 3/8” (1.0 cm) gas line on the dryer. The National Fuel Gas Code requires that an accessible, approved manual gas shut off valve be installed within 6 feet of the dryer.
- **Gas Dryers installed in residential garages must be elevated 18 inches (46 cm) above the floor.**
- Additionally, a 1/8” (.3 cm) N.P.T. (National Pipe Thread) plugged tapping, accessible for test gauge connection, must be installed immediately upstream of the gas supply connection to the dryer.
- The dryer must be disconnected from the gas supply piping system during any pressure testing of the system.
- **DO NOT** re-use old flexible metal gas line. Flexible gas line must be design certified by American Gas Association (CGA in Canada).
- NOTE: •Any pipe joint compound used must be resistant to the action of any liquefied petroleum gas.
- As a courtesy, most local gas utilities will inspect a gas appliance installation.
- **GAS IGNITION** – This dryer uses an automatic ignition system to ignite the burner. There is no constant burning pilot.

Gas Dryer Connections

Gas Connection

The gas dryer comes set up for natural gas but can also be converted to LP. The gas connection must be reduced from ½" to 3/8" to attach to the dryer gas inlet.

Dryer Duct Installation Part 1



Warning! Restricting the exhaust duct will reduce efficiency and could create a fire hazard. Do not use lint-trapping screws or crease the flex duct.

Use 4” diameter rigid metal duct.

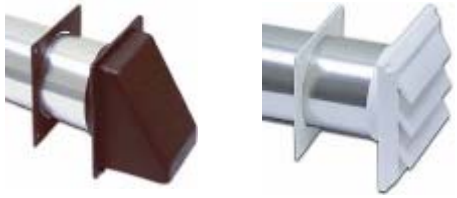
Tape all joints, including the dryer outlet.

Keep ducts as straight as possible.

DO NOT EXHAUST DRYER INTO ANY WALL, CEILING, CRAWL SPACE OR A CONCEALED SPACE OF A BUILDING, GAS VENT, ANY OTHER COMMON DUCT OR CHIMNEY. THIS COULD CREATE A FIRE HAZARD FROM LINT EXPELLED BY THE DRYER.

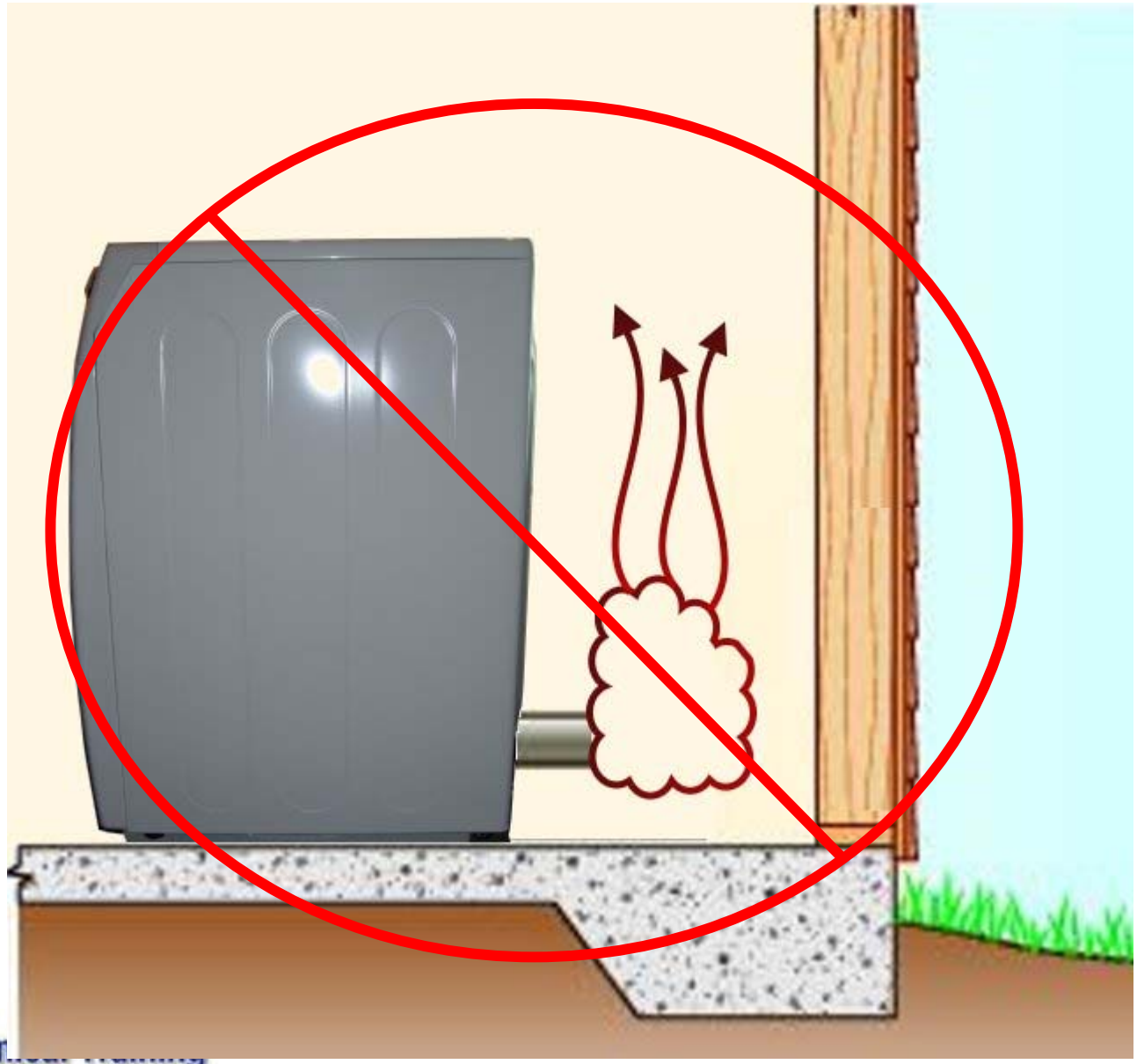
Note: these parts are not supplied and must be purchased locally.

Dryer Duct Installation Part 2

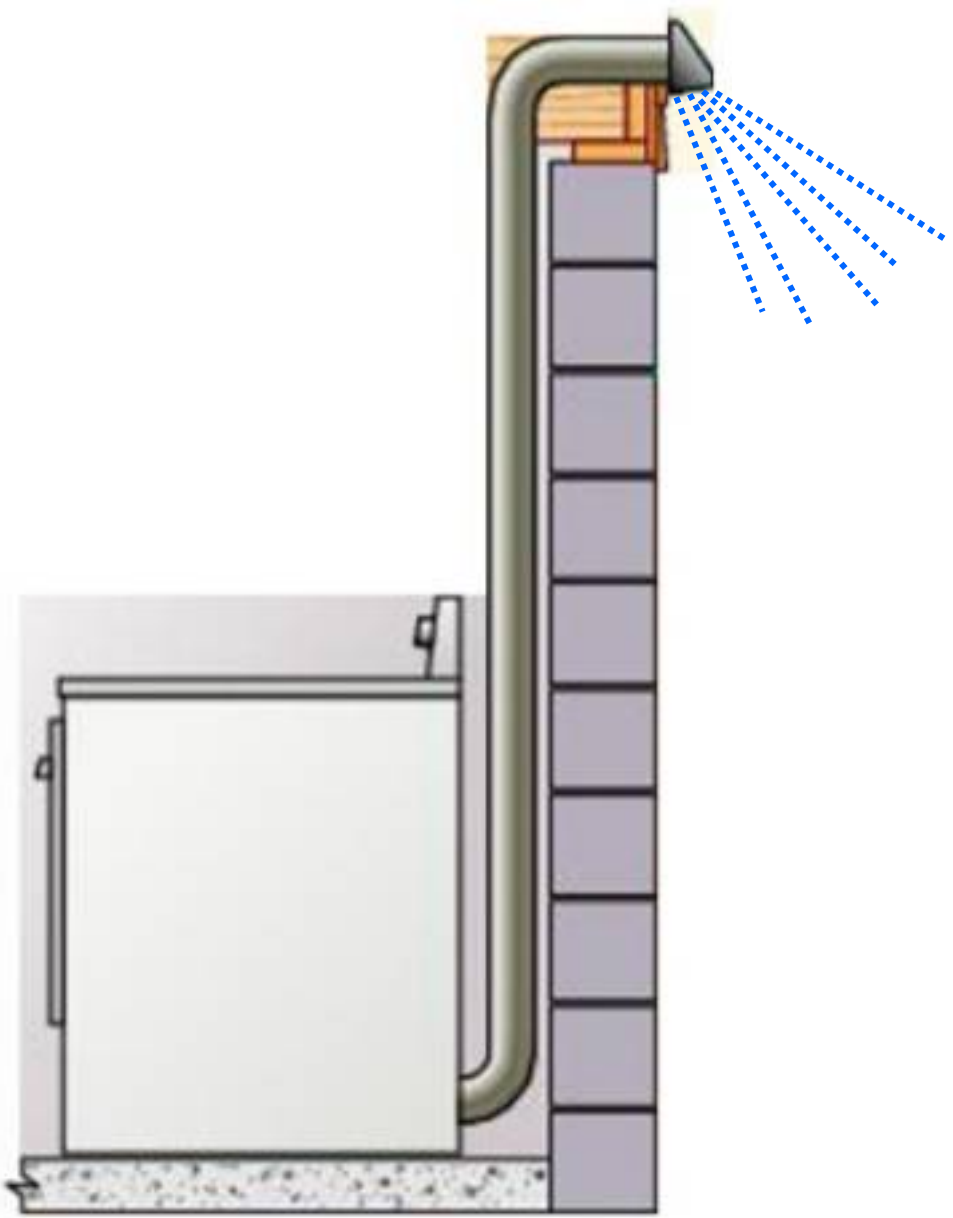
	4” (10.16cm) 		2 1/2”(6,35 cm)	
Number of 90 degree elbows	**Rigid**	**Metallic Flexible**	**Rigid**	**Metallic Flexible**
1	**80 ft. (24.4m)**	**41 ft. (12.4m)**	**74 ft (22.6 m)**	**33 ft. (10.1m)**
0	**68 ft. (20.7m)**	**37 ft (11.2m)**	**62 ft. (18.9m)**	**29 ft. (8.8m)**

- Plastic flexible ducts can kink, sag, be punctured, reduce airflow, extend drying times and affect dryer operation.
- Exhaust systems longer than recommended or with more than one 90 degree bend can extend drying times, affect machine operation and may collect lint.
- The exhaust duct should end with an exhaust hood with a swing out damper to prevent back drafts and entry of wildlife. Never use an exhaust hood with a magnetic damper.
- The hood should have at least 12 inches (30.5 cm) of clearance between the bottom of the hood and the ground or other obstruction. The hood opening should point down.
- Never install a screen over the exhaust outlet.

Do NOT vent to the inside

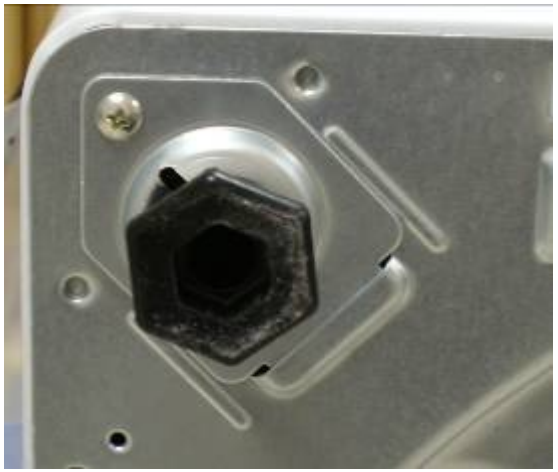


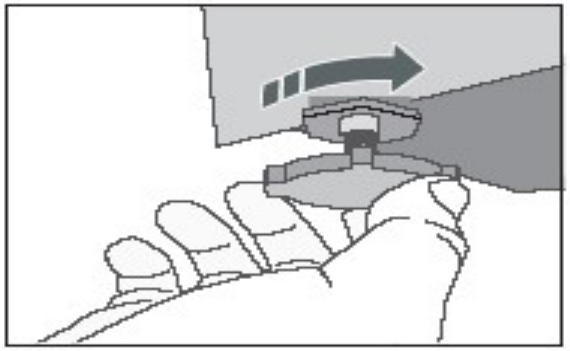
ALWAYS vent to the outside



Leveling the Dryer

1. Loosen the leg assembly by turning the lock nut counter-clockwise
2. Level the unit side to side and front to back by adjusting the four leg heights.





2. Secure the legs by tightening the lock nuts on each corner against the base frame.

Converting to LP Gas

L.P. Kit Model #
SAMSUNG LPKIT-3/XAA

THIS APPLIANCE HAS BEEN CONVERTED
ON_____ TO LP GAS WITH KIT
NO. LPKIT-3/XAA BY _____
WHO ACCEPTS THE RESPONSIBILITY FOR
THE CORRECTNESS OF THIS CONVERSION.
MAIN BURNER ORIFICE: 54
INPUT RATING: 22,000 BTU/HR
MANIFOLD PRESSURE: 11 IN. W.C.
NRTL
153-5975

WARNING
This conversion kit shall be installed by a qualified service agency in accordance with the manufacturer's instructions and all applicable codes and requirements of the authority having jurisdiction. The information in these instructions must be followed to minimize this risk of fire or explosion or to prevent property damage, personal injury or death. The qualified service agency is responsible for the proper installation of this kit. The installation is not proper and complete until the operation of converted appliance is checked as specified in the manufacturer's instruction supplied with the kit.
LPKIT-3/XAA
153-5978C

WARNING
VALVE CONVERTED FOR USE ON L.P. GAS.
IMPROPER OPERATION COULD RESULT
IN DEATH OR SERIOUS INJURY.
MISE EN GARDE
SOUPAPE CONVERTIE POUR USAGE
SUR GAZ DE PÉTROLE LIQUÉFIÉ. UN
FONCTIONNEMENT INAPPROPRIÉ PEUT
PROVOQUER LA MORT OU DES BLESSURES
GRAVES.

The L.P. conversion kit is a model number, not a part that can be ordered from GPCA or Marcone. The kit consists of the blocking plug, a new orifice and various warning labels.

***This kit must be installed in accordance with state and local codes by qualified personnel.**

Chapter 21

Dryer Test Modes and Diagnostic Procedures

Test and Error Checking Procedures

DV448 Service Mode

Continuous Run Mode

1. Press Dry Level + Signal for 3 sec during Power On State (normal user mode).
2. Once in Continuous Run Mode, “total cycle” and the remaining time will blink in the display.
3. The previous cycle will restart during Continuous Run Mode until the mode is deactivated.
4. During Continuous Run Mode, press Dry Level + Signal for 3 seconds to go back to normal user mode, “total cycle” will go off and the remaining time will stop blinking and the cycle will complete.

DV448 Service Mode

System check mode

Special test mode:
While in Power Off, pressing the Dry Level + Power buttons simultaneously will put the dryer into the System Check mode “t2” will display. System Check Mode Progress in the t2 mode function turns on the Motor (CW) relay, turns the Heater relay on and off, Motor (CW) Relay Off

Special Test Mode

To enter Service Mode, press Temp + Signal for 3 seconds, or until it sends out a beeping sound 3 times.
(same for all Frontier models)

Sensor Bar Touch Data Mode

Press Temp + Signal for 3 seconds <u>during the drying cycle</u> (same for all Frontier models). When there are wet items being dried, data will change from 0 to 1200 as the wet clothes touch the sensor bars. This procedure checks the moisture sensor bars ability to detect moisture. If the readings do not change with wet clothes inside, check the sensor bars.

Cycle Count Mode

The purpose of this test is to display the total number of cycles the dryer has completed. While in the service mode press the **signal** button to display the count.

Washer Error Codes Part 1

No	LED Display	Code	Description	Corrective Action
1	nd	1	The water level fails to drop below the Reset Water Level within 15 minutes.	Go to " Will Not Drain" Troubleshooting Section.
2	LO	2	Door fails to unlock after 3 attempts.	Go to " Will Not Unlock" Troubleshooting
3	nF	3	When the water fill continues for more than 16 minutes or there is no change of water level for 3 minutes	Go to " No Water Fill" Troubleshooting Section.
4	FL	4	Door fails to lock after 3 attempts.	Go to " Will Not Lock" Troubleshooting.
5	nF1	5	The Hot/Cold water connection is not correct	Correct Hot/Cold hose connections
6	LeE or LE	8	Water Level Sensor Trouble. (When the input signal from the water level sensor is out of range, the unit will send out beeping sounds and halt the cycle.)	Go to "No Water Fill" Troubleshooting Section.
7	OE	E	A fault is detected in the water level sensor. Data (frequency) shows the water level is at or above the overflow water level. Drain process may also occur.	First check to see that all of water valves are not stuck. If water valves are OK, check water level sensor
8	dc	10	Unbalance or cabinet bump is detected during final spin, which prevents the drum from spinning over 400 rpm. (Never exceeds 400 RPM due to unbalanced load)	Go to "Wet Clothes" Troubleshooting Section
9	-	11	EEPROM Fault. (Program settings are being reset.)	Go to "EEPROM Clear Mode" If display shows "FAiL", Replace Machine Control Board
10	E2	15	Jammed/Stuck Key. (When key input signals are detected for more than 30 seconds, it is a stuck key.)	Check all of keys. If A key is sensed to be pressed, all keys will do not respond
11	dL	18	Door is detected as open when the motor is operating.	Check for loose connections. Use "Quick Test Mode" do Door lock/Unlock Test & Motor Test.
12	dS	22	Door is detected as open while trying to lock the door.	Go to "Quick Test Mode" and then do Door Lock/Unlock Test
13	bE	25	Motor hall sensor signals sent without motor operation.	Replace Machine Control Board

Washer Error Codes Part 2

14		29	Abnormal high/low temperature or resistance (Thermal sensor or PBA) resistance.	Go to " Board Input Test" and check Water Temperature. Check loose or pinched wires. Replace PCB or thermistor.
15	E3	2E	MICOM is attempting to drive the motor but is not getting any response signals from the hall sensor. Visual check shows motor is not running. (Locked, Defective Hall Sensor or Overload)	Evaluate wire harness for loose or unhooked connections Go to " Quick Test Mode" and test Motor
16	Sr	34	System Relay (Main Relay) Failure. (PCB does not notice the relay operation when there should be.)	Replace PCB.
17	Hr	36	Heater Relay Failure (No Heater Relay Check Signal)	Replace PCB
18	3E	3E	Over-current is detected. Motor won't turn. (IPM detects over-current.)	Check wire harness for loose or open connections. Use " Quick Test Mode" to test Motor.
19	2E	91	Voltage for motor control bus is over specified limit	Check AC line voltage - Replace PCB
20	2E	92	Voltage for motor control bus is under specified limit.	Check AC line voltage - Replace PCB
21	8E	8E	MEMS Sensor Failure. (No MEMS Sensor Check Signal)	Check MEMS PCB ,Main PCB & Wire-harness
22	7E	7E	Silver Care Kit (Silver Care PCB) Failure.	Check Silver Care PCB ,Main PCB & Wire-harness
23	PF	-	It occurs when there is power failure during the washing. ("PF" is not an error. It is to inform of power failure.)	-
24	SUdS or Sd	-	Suds is detected during the washing session. ("SUdS" is not an error. If the washer is in suds period, "SUdS" will light up instead of remaining time.)	Guide a user to reduce amount of detergent usage.

DV448 Error Codes

NO	LED Display	Error Image	Description	Corrective Action
1	tS	Error! Temperature Sensor Problem	The Thermistor resistance is very low or high.	Check for: - Clogged lint screen - Restricted vent system. - Check Thermistor resistance.
2	tO	Error! Temperature Sensor Problem	The Thermistor resistance is very low or high.	Check for: - Clogged lint screen - Restricted vent system. - Check Thermistor resistance.
3	dO	Error! Door is Open	Running the dryer with the door open	Check for: - Close the door and run the dryer - Loose or open wire terminals in Door sense circuit.
4	dF	Error! Door Open Sensing Problem	Invalid state for more than .25 seconds	Check for: - Loose or open wire terminals in Door sense circuit.
5	bE	Error! A button is either stuck or is being pressed continuously	Invalid state of button or circuit. A button is reading being pressed for 75 seconds	Check for: - Display PCB key circuit shorted or button stuck

DV448 Error Codes

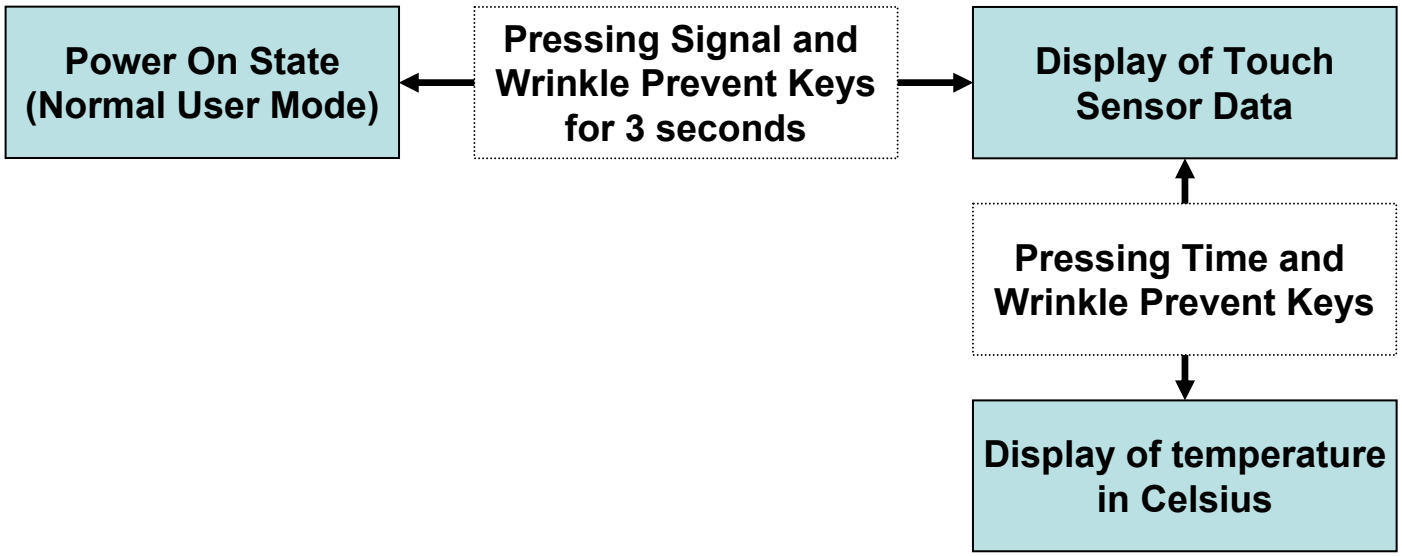
NO	LED Display	Error Image	Description	Corrective Action
6	Od	Error! Time Limit Exceeded	Invalid Dry time. Excessive Dry time	Check: - Moisture Sensor bar Open - Using the "Adjust Time Up" incorrectly
7	hE	Error! Overheated	Invalid heating temperature while running the dryer	Check for: - Restricted vent system. - Check Thermistor resistance.
8	Et	Error! Electronic Control Problem	Invalid state of EPROM communication	Check/replace: - Main PCB with EPROM circuit
9	FE	Error! Power Interruption	Invalid power source Frequency	Check for: - Nonstandard power source frequency (60Hz) - Invalid power frequency sense Circuit - Power failure or blown circuit Breaker or fuse

Temperature Test Diagnostic procedure

☐ VOC : All of the dryers Samsung built for Maytag, MDE9700 & MDG9700, had a test mode that would show the temperature at the thermistor on the display.
This is very important in ease of troubleshooting and accuracy of part ordering.
Could you find out how to access this on Samsung dryers?

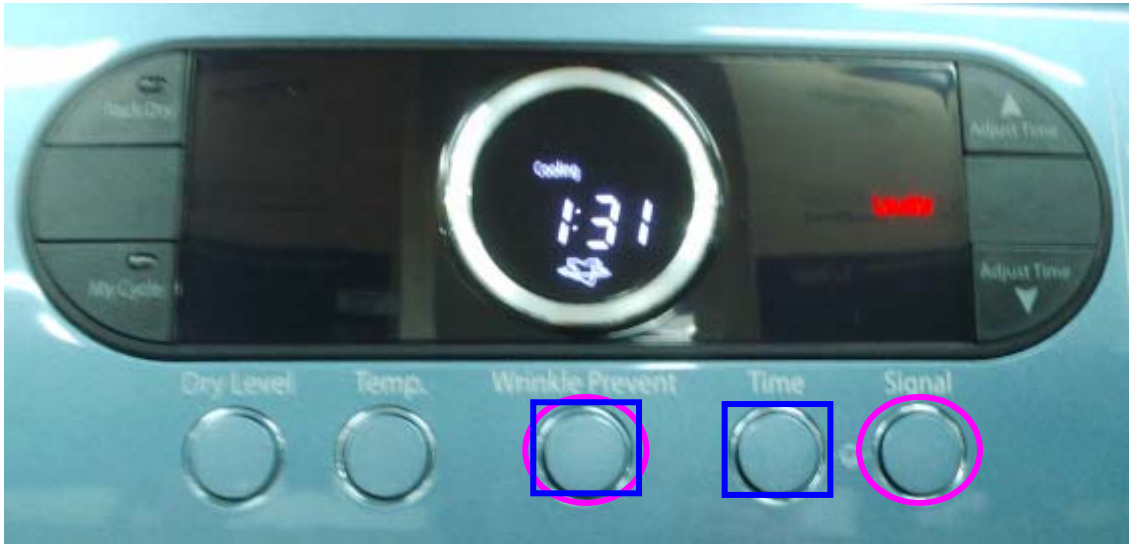
☐ How to access to show the temperature

1. Press Signal + Wrinkle Prevent Keys for 3 sec during Power On State (Normal User Mode) .
2. Press Time + Wrinkle Prevent Keys and 7-segment will display the temperature in Celsius


Power On State (Normal User Mode)
Pressing Signal and Wrinkle Prevent Keys for 3 seconds
Display of Touch Sensor Data
Pressing Time and Wrinkle Prevent Keys
Display of temperature in Celsius

Temperature Test Diagnostic procedure

☐ **Frontier Series**

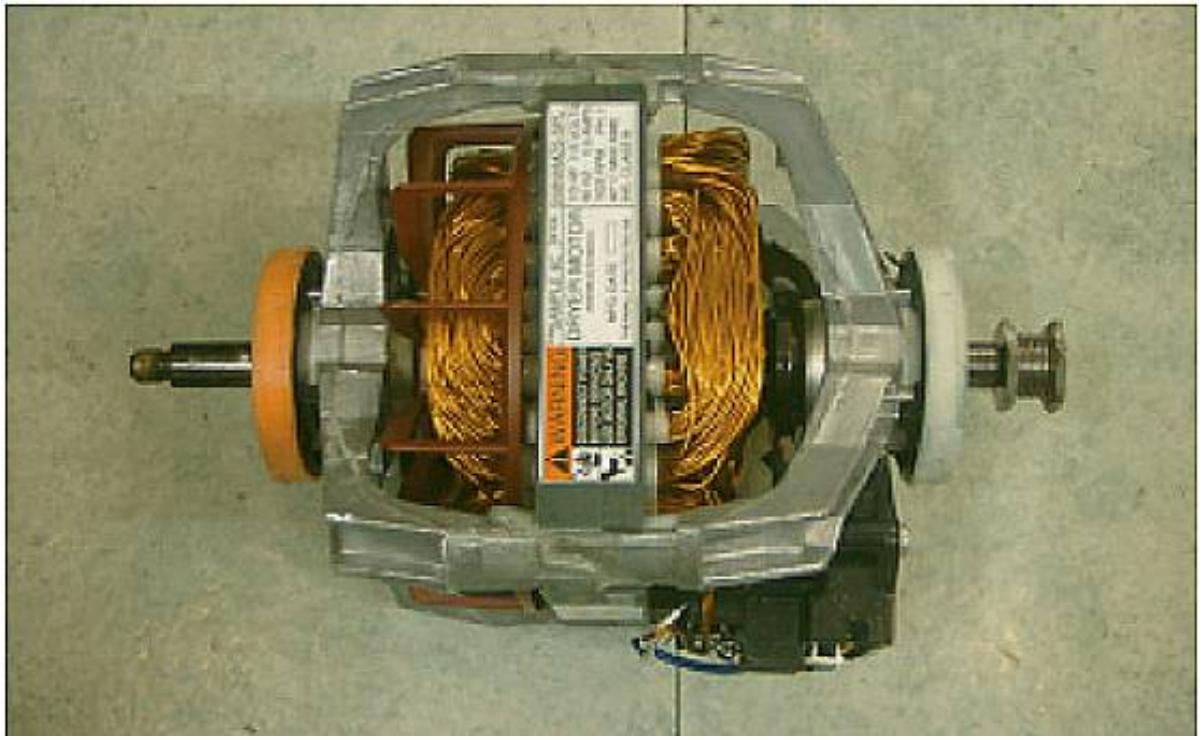


Press first for 3 sec during Power On State

Press second and 7-segment will display the temper ature in Celsius

☐ **Purple Series**

Motor Troubleshooting and Replacement



Like most dryers there is only one motor that drives the drum and the blower fan for venting and air circulation.

DRYER
Test Mode and Error Check Procedure

Continuous Run Mode

Continuous Run Mode:

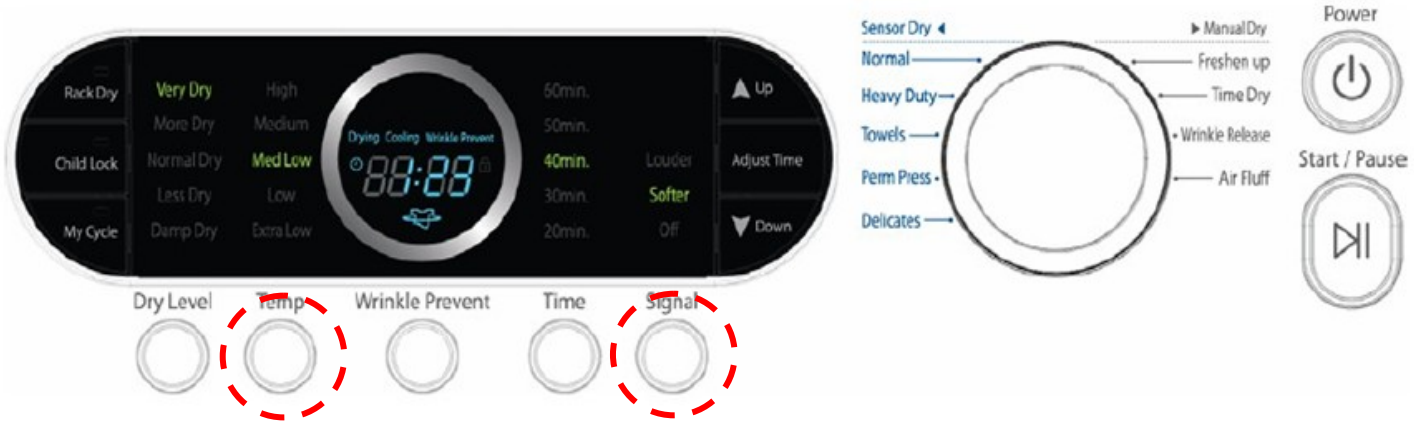
1. Press Signal + Dryness Level for 3 sec during Power On State (Normal User Mode) .

2. Once in Continuous Run Mode, 7-Segment will toggle display “cc” and the remaining time.

3. The previous cycle will restart during Continuous Run Mode until continuous run mode is disabled.

4. During Continuous Run Mode, press Signal + Dryness Level for 3 seconds to return to normal user mode 7-segment will no long display “cc” and only display the remaining time.

Sensor Bar Test Mode



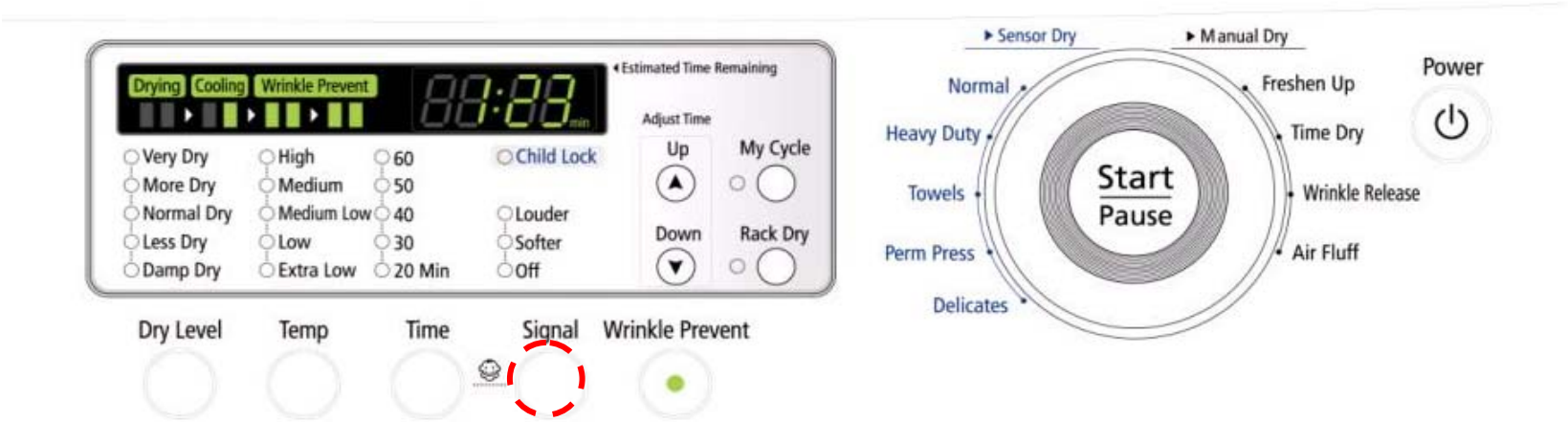
Definition of Sensor Bar Touch Data Mode:

- This test checks the Moisture sensor bar .

How to Enter:

Start Dryer tumbling, Press Temp + Signal for 3 seconds during the drying process (same for all Frontier models.)
Open door, touch both sensor bars with wet cloth, sensor hit numbers show in display.

Cycle Count Mode



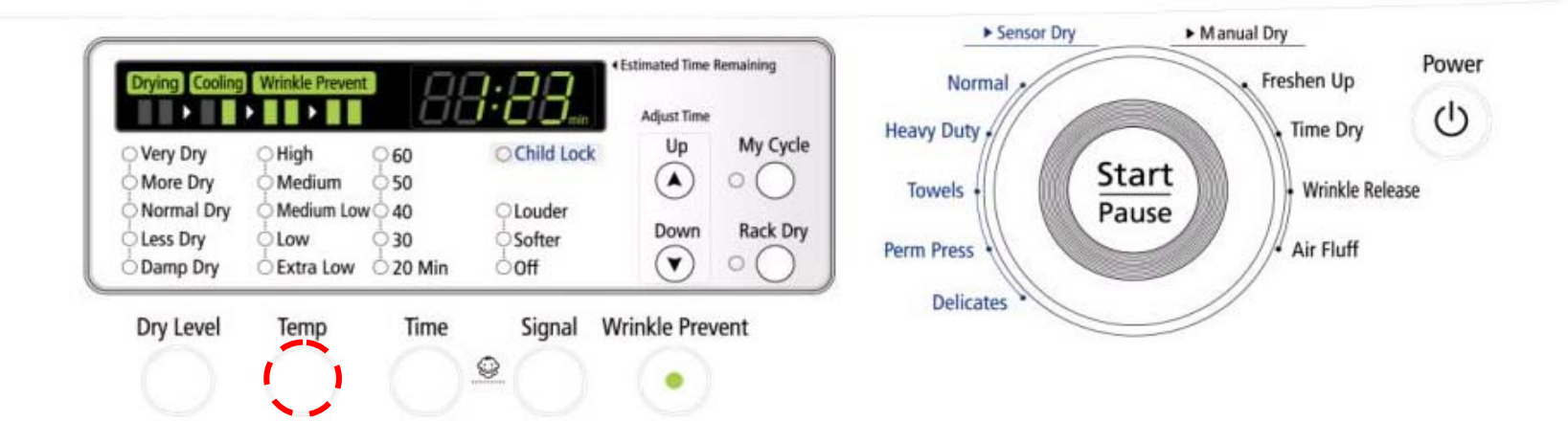
Definition of Cycle Count Mode:

- While in Service Mode pressing the Signal key will put the dryer into the cycle count mode

-Cycle number executed will display.

-To enter Special Test Mode press While in Service Mode pressing the Signal key for 3 seconds or until the control beep.

Software Version Check



Definition of Software Version Mode:

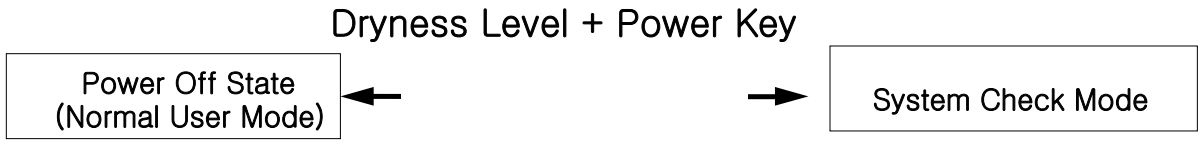
- While in Service Mode pressing the Temp key will put the dryer into the software version mode

How to Enter:

- To enter Special Test Mode press Temp Key until the control beep.
  (same for all Frontier models.)

ex) In case of "U105", U0 means major version "v1“ 05 means minor version "05"

Dryer Forced Mode Operation



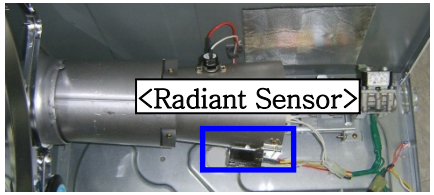
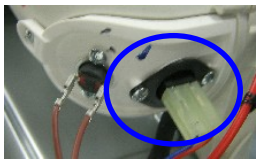
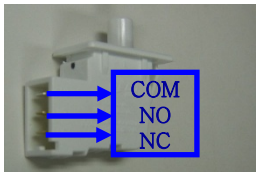
Special Test Mode:

- While in Power Off, pressing the Dryness Level + Power keys simultaneously will put the dryer into the System Check mode
- " t2 " will display.

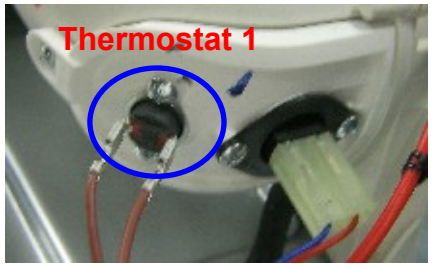
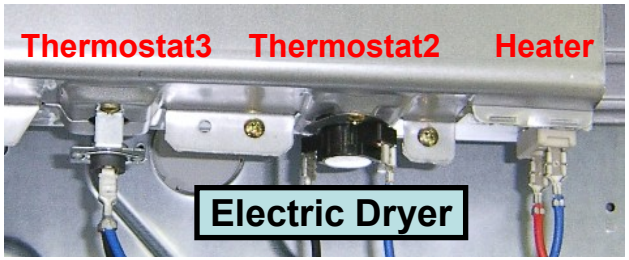
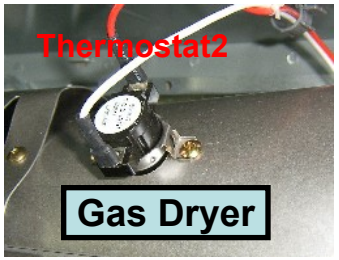
- System Check Mode Progress

t2 mode Function Performed Start/Pause Motor(CW) Relay On → Heater Relay On → Heater Relay Off → Motor(CW) Relay Off (Circulation)

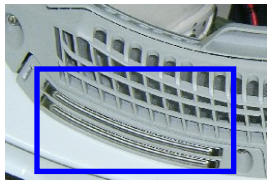
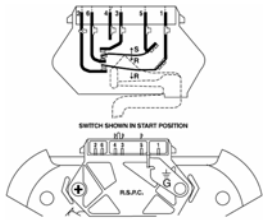
Dryer Component Check

Parts	Image	Description	Value
	[Gas]  [Electric]		
Thermistor		**Unplug the connector and test from wire insertion side. Pin #2 and Pin #6 of CN6**	**10 KΩ @ 77° F/25°C**
Door Switch		**Unplug the connectors and test switch terminals. Door open terminals COM to NC Door open terminals COM to NO Door closed terminals COM to NC Door closed terminals COM to NO**	**Infinity Less than 1 Ω Infinity Less than 1 Ω**
Lamp		**Unplug the connectors and test the switch terminals. Check across the terminals**	**80 to 100 Ω**
Belt Switch		**Unplug the connectors and test the switch terminals. Check across the terminals with the switch closed**	**Less than 1 Ω**
		Check across the terminals with the switch open	**Infinity**

Dryer Component Check

Parts	Spec	Description	Value
  			
Thermostat 1	**Thermostat Cut Off 185°F/85°C, 25A**	**Unplug the connector and measure its resistance**	**Less than 1 Ω**
Thermostat 2	**Hi Limit 260°F/117°C, 25A (Electric) 230°F/110°C, 25A (Gas)**	**Unplug the connector and measure its resistance**	**Less than 1 Ω**
Thermostat 3	**Thermostat Cut Off 320°F/160°C, 25A**	**Unplug the connector and measure its resistance**	**Less than 1 Ω**
Heater	**240V 5300W**	**Unplug the connectors and test the Heater terminals**	**10 Ω**

Dryer Component Check

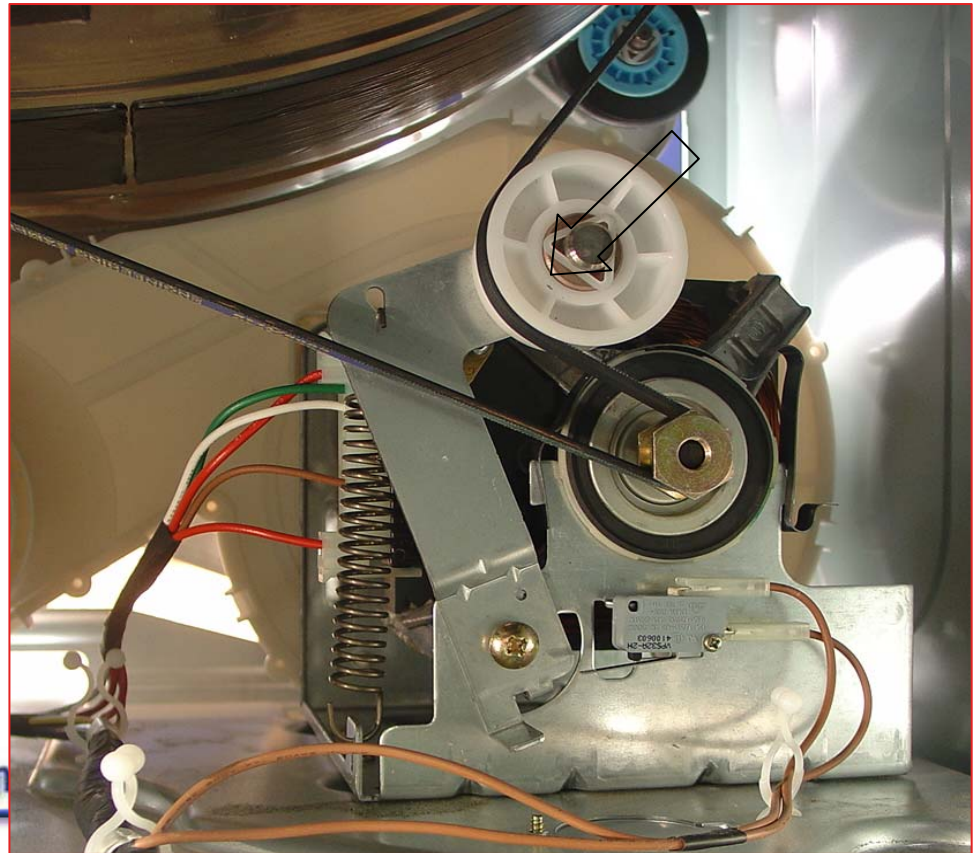
Parts	Image	Description	Value
Radiant Sensor (Gas)		Unplug the connectors and test sensor terminals.	Closed
Sensor Bars		Unplug the connector and measure its resistance. Pin #4 to Pin # 5 of CN6	Infinity dry load 190 Ω ± 10% wet load
Motor		Unplug the harness connector and test the motor circuits. Pin #4 and Pin #5 (Windings) Pin #1 and Pin #2 (Centrifugal switch) Refer to 5-2 wiring for differences between Electric & Gas	 2 Ω Open
Gas Valve		Unplug the connectors and test the valve terminals (its numbering is from the front terminal.) Check across terminals #1 and #3 (Booster Coil). Check across terminals #1 and #2 (Holding Coil). Check across terminals #2 and #3 (Both coils in series). Check across terminals #4 and #5 (Secondary Coil).	 550 Ω 1350 Ω 1900 Ω 1300 Ω

Dryer Common Service Call Issue

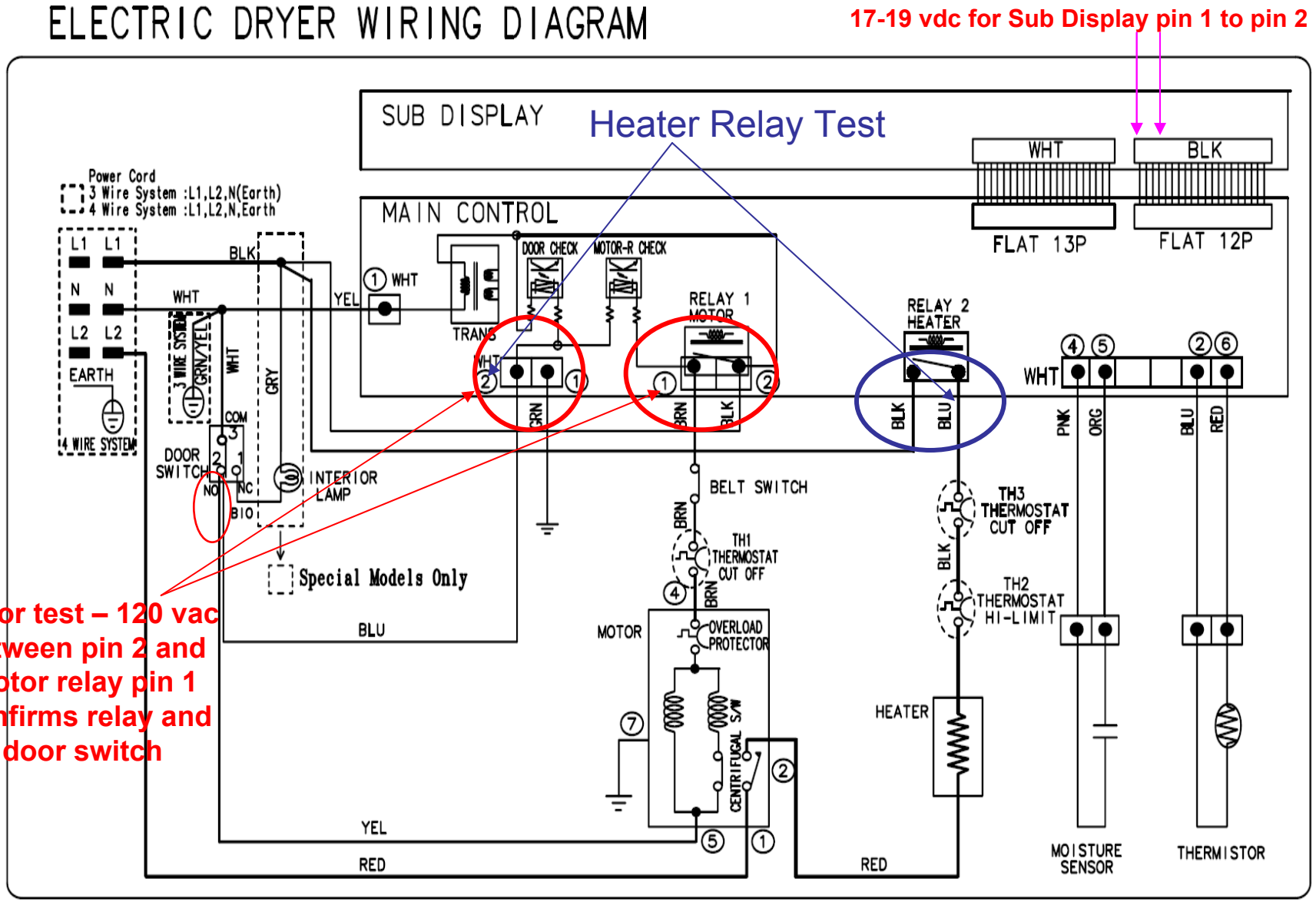
Consumer complaint – Dryer doesn't shut off, runs too long

Q. What does it mean when chasing light appear in the display?	**A. The chasing lights appear in the display when the Wrinkle Prevent option is selected. This lets you know that the dryer is tumbling intermittently for 95 minutes with room temperature air after the cycle is complete to reducing wrinkling. The load is dry and can be removed at any time during Wrinkle Prevent.**

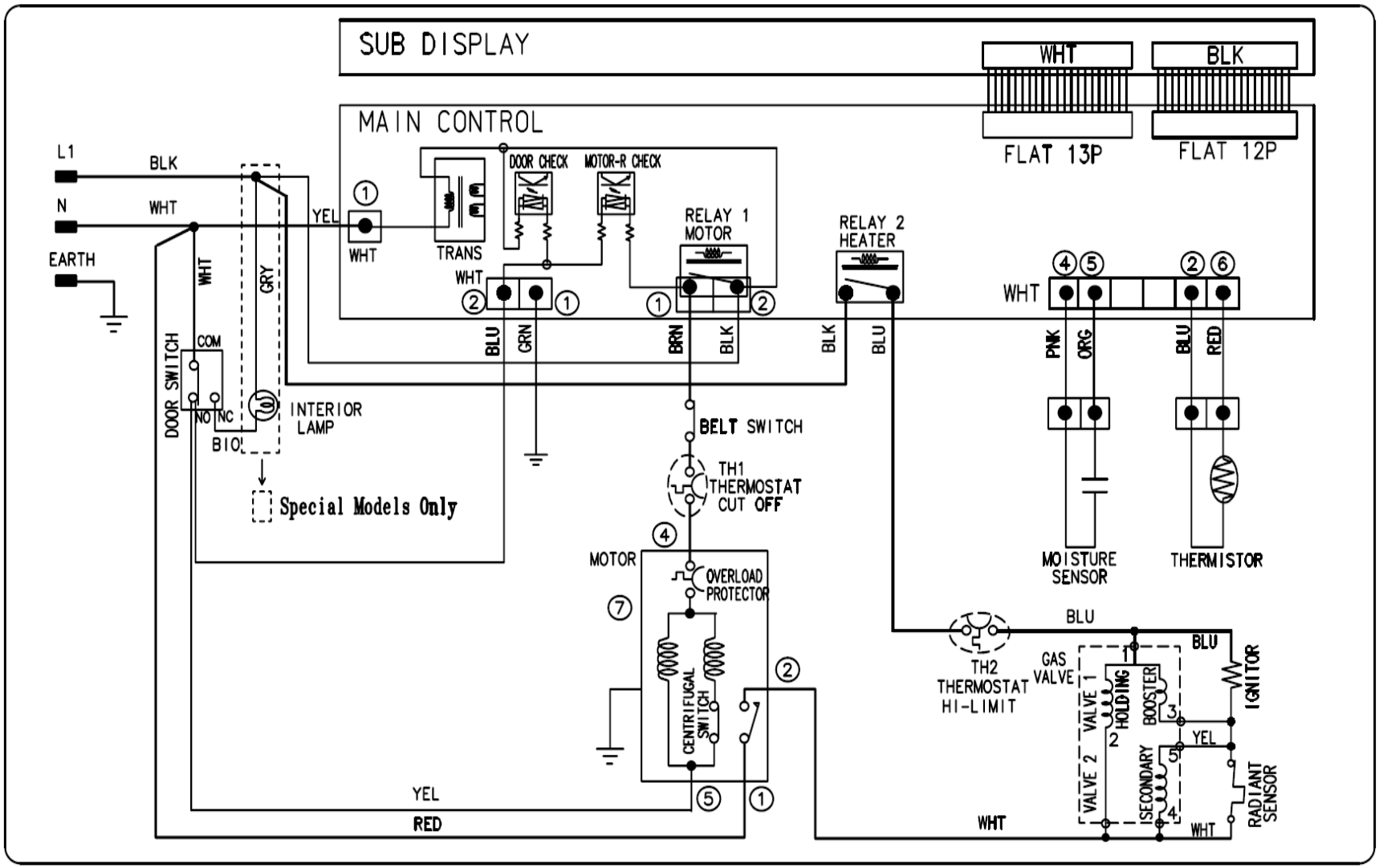
Dryer Belt Path



Electric Dryer Wiring Diagram

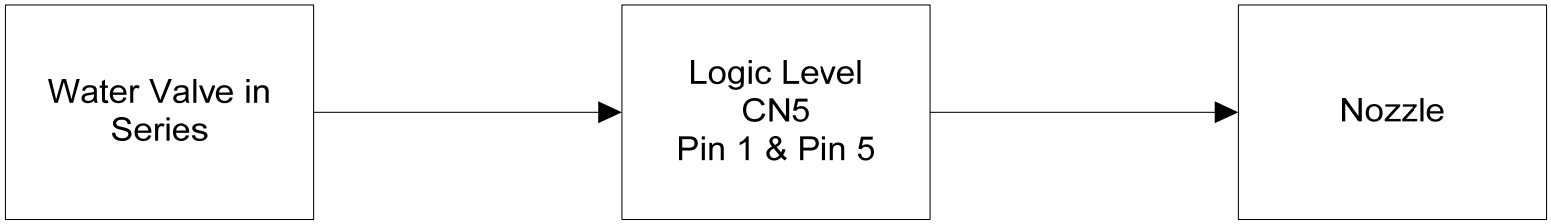


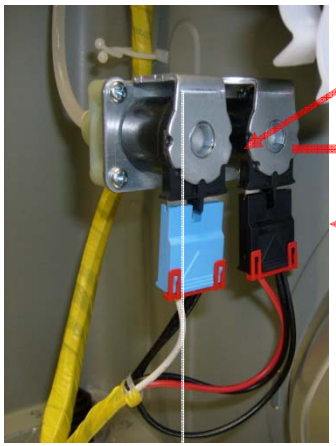
Gas Dryer Wiring Diagram



Steam Cycle DV448

- The technical description on the Steam cycle process of the DV448 Dryer.

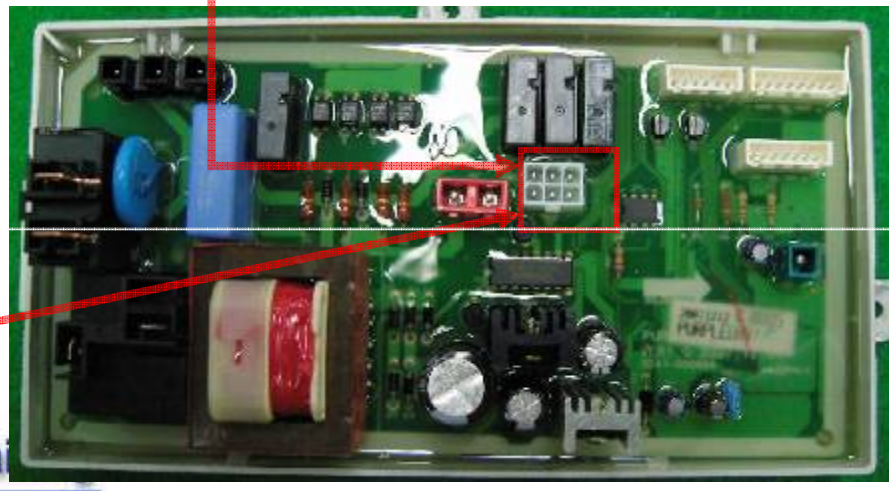




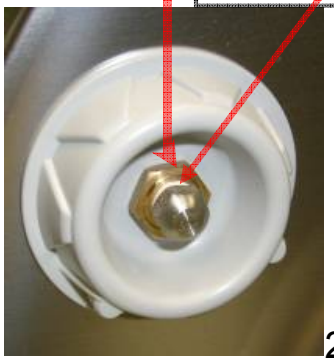
Dual Water Valve

Water Output

Main PCB ASSY

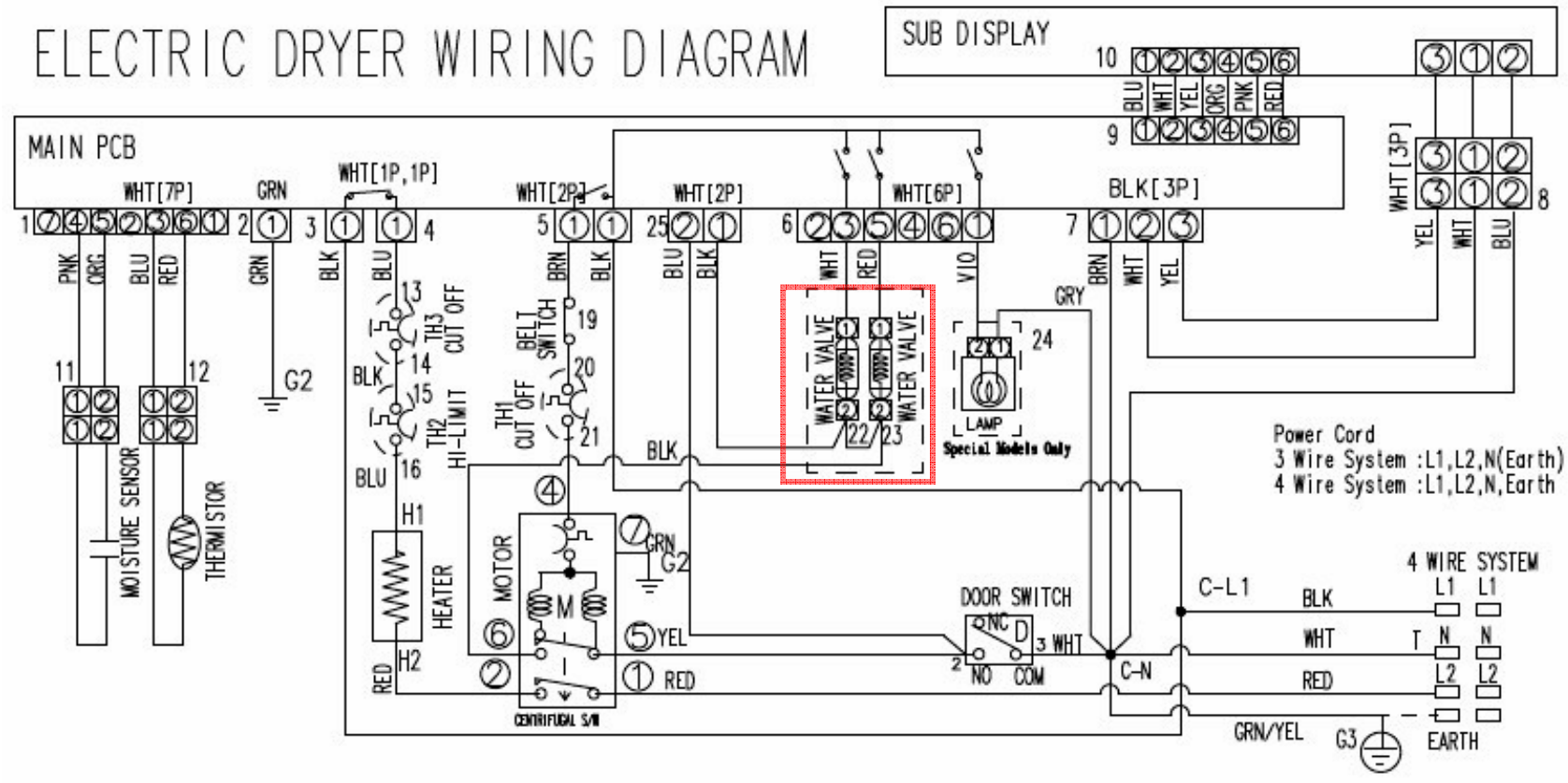


Nozzle



CN5
1.STEAM VALVE1
2.Empty Pin
3.LAMP
4.Empty Pin
5.STEAM VALVE2
6.Empty Pin

Schematic Diagram DV448



Steam Cycle DV448

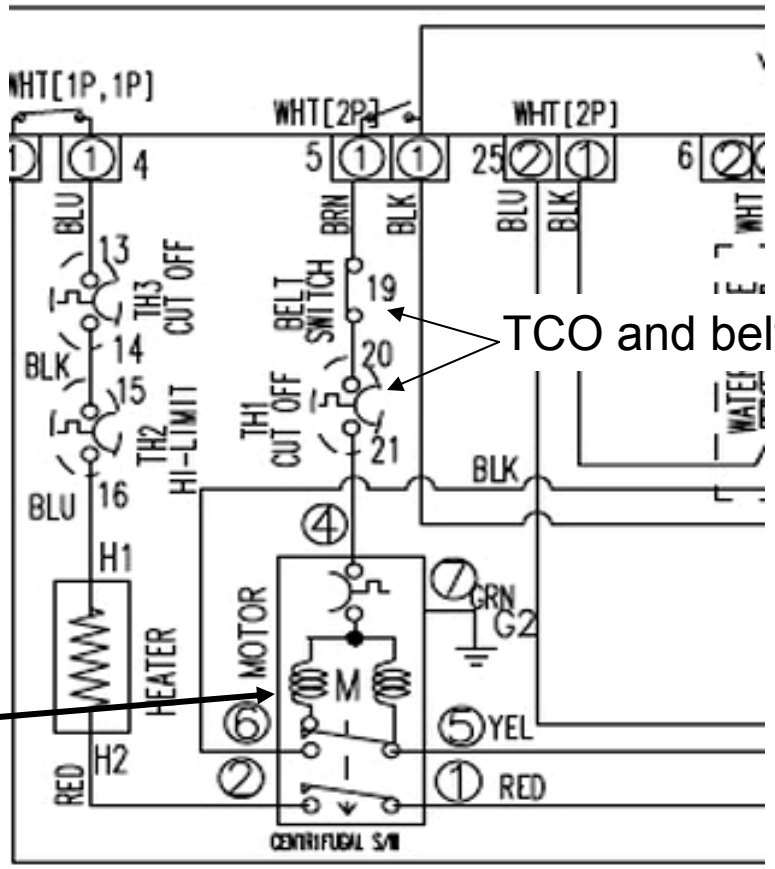
1. Refresh Course

time	Time and Control Temp.											
	Soft keep	1 Spray Resign	1st Heating Resign			2 Spray Resign			2st Heating Resign			Cooling resign
	Time	Time	Time	Control Temp.		Time	Control Temp.		Time	Control Temp.		Time
				Heater Off	Heater On		Heater Off	Heater On		Heater Off	Heater On	
15 min	30Sec.	1min.	4min.	64℃	56℃	30Sec.	64℃	56℃	8min.	64℃	56℃	1min.

2.Wrinkle Care

time	Time and Control Temp.														
	1st Heating Resign			1 Spray Resign			2nd Heating Resign			2nd Spray Resign			3rd Heating Resign			Cooling resign
	Time	Control Temp.		Time	Control Temp.		Time	Control Temp.		Time	Control Temp.		Time	Control Temp.		Time
		Heater Off	Heater On		Heater Off	Heater On		Heater Off	Heater On		Heater Off	Heater On		Heater Off	Heater On	
20 min	1min	58℃	50℃	1min.	58℃	50℃	1min.	58℃	50℃	1min.	58℃	50℃	13min.	58℃	50℃	3min.

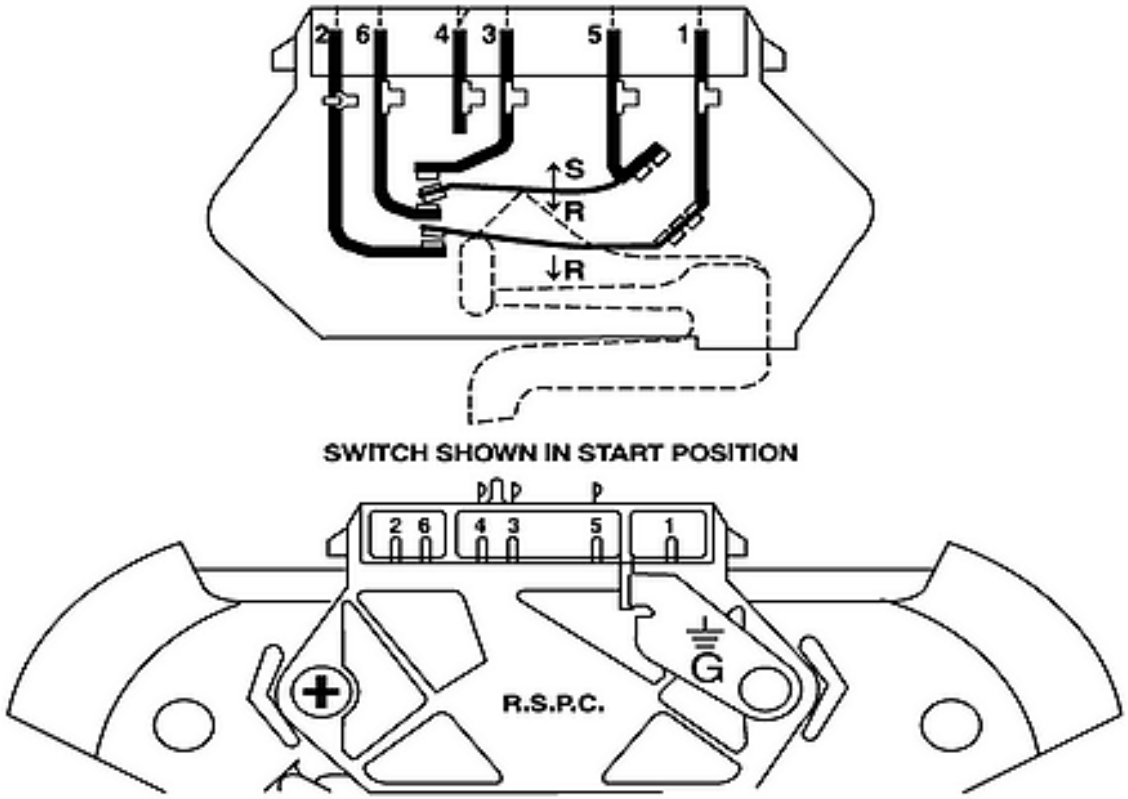
Motor Schematic Diagram



TCO and belt switch

Windings of the motor with the internal TCO

Checking the Motor



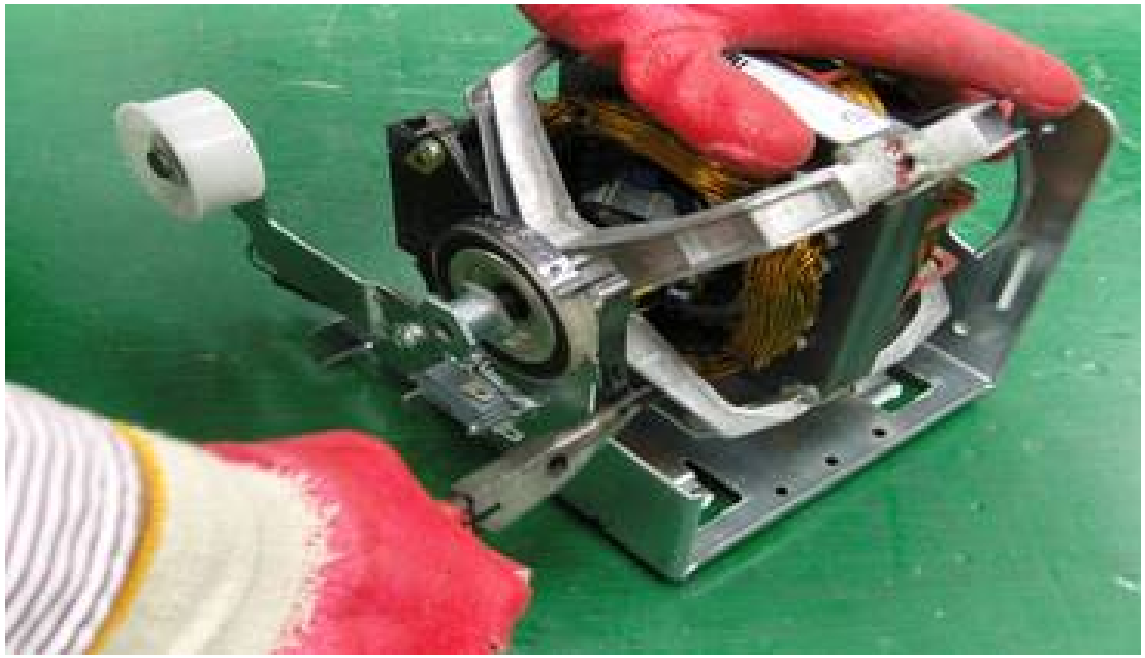
Unplug the harness connector and the test motor circuits.

Pin 3 and Pin 4 (Windings) should read ~ 2.88 Ω

Pin 4 and Pin 5 (Windings) should read ~ 2.88 Ω

Pin 1 and Pin 2 (Centrifugal switch) should read ∞

Removing the Drum Motor



Once the front panel and the blower is removed from the motor, the motor can be removed from the machine and by unhooking the spring clamps, the motor can be removed form the base holder. Also attached to the motor mount is the belt sensor switch

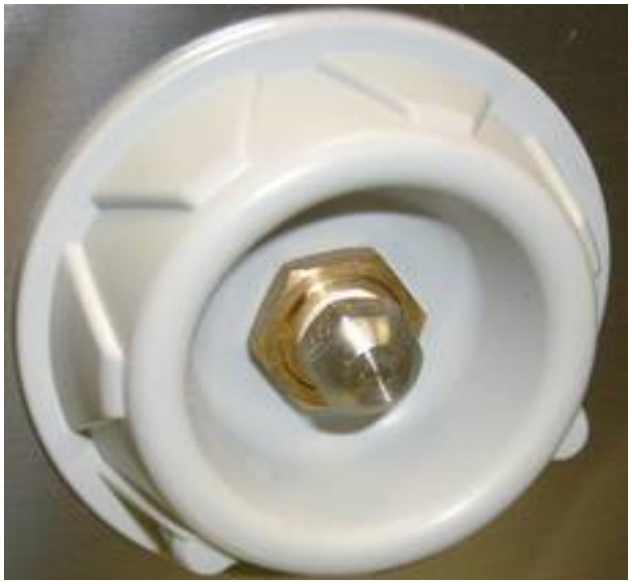
Belt Tension Sensor Switch

While inspecting the motor, check and adjust the belt tension switch. Replace if necessary while the motor is out of the machine

DV448 Water and Steam

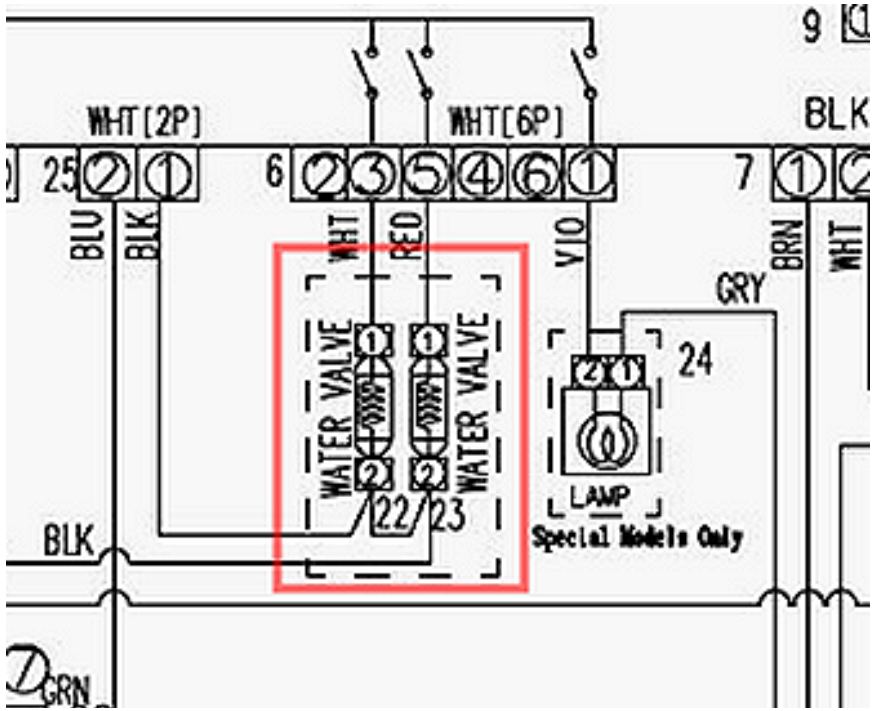
Dual solenoid water valve

Fine mist spray nozzle



The steam feature in the dryer consists of two major components

Water Valve Schematic Diagram



The purpose of the dual solenoids are to compensate for variations in water pressure.

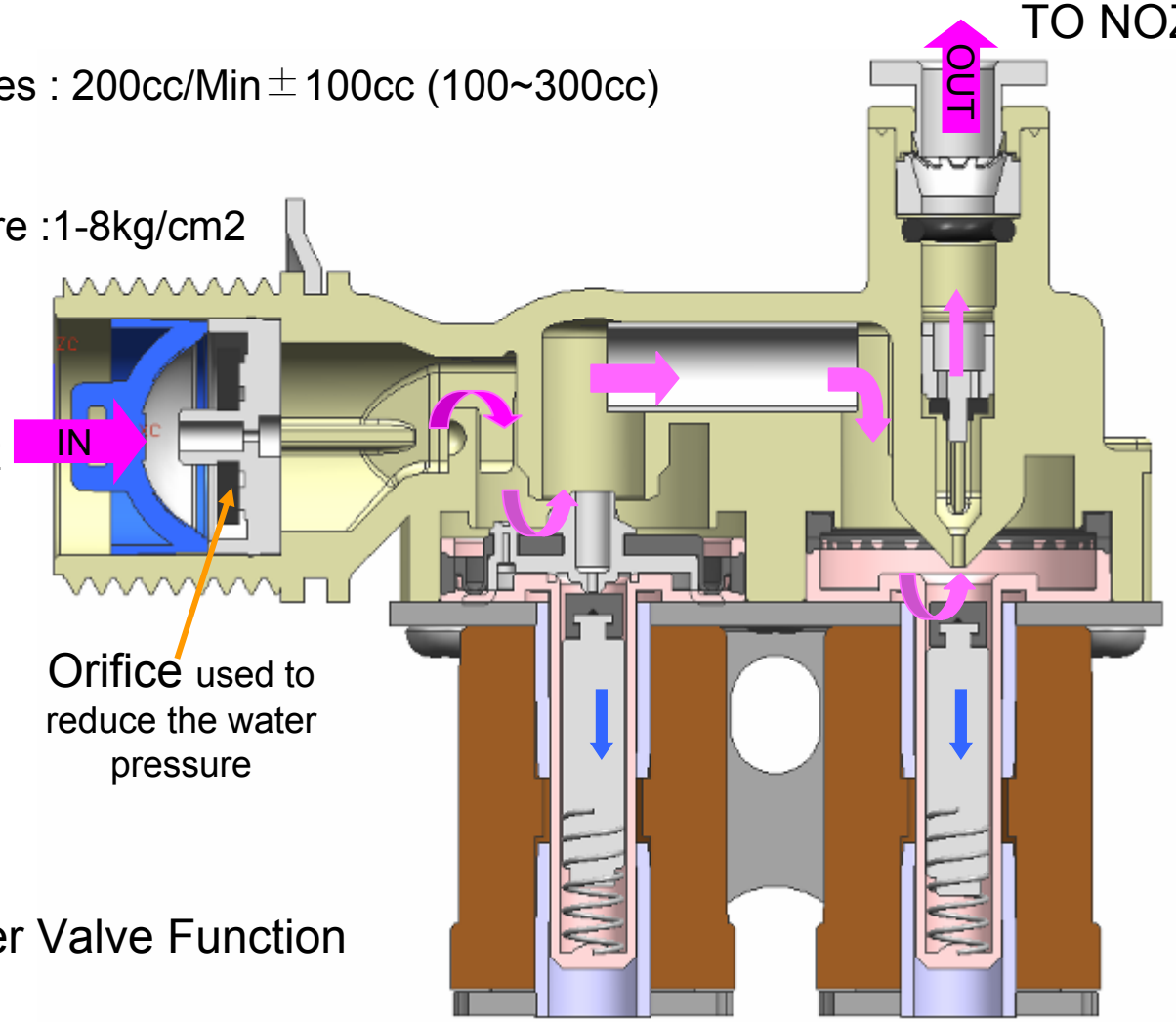
The pressure and flow rates are:

100±50cc/min	at 1-5kg/cm^2
175±75cc/min	at 6-8kg/cm^2

Steam System Function

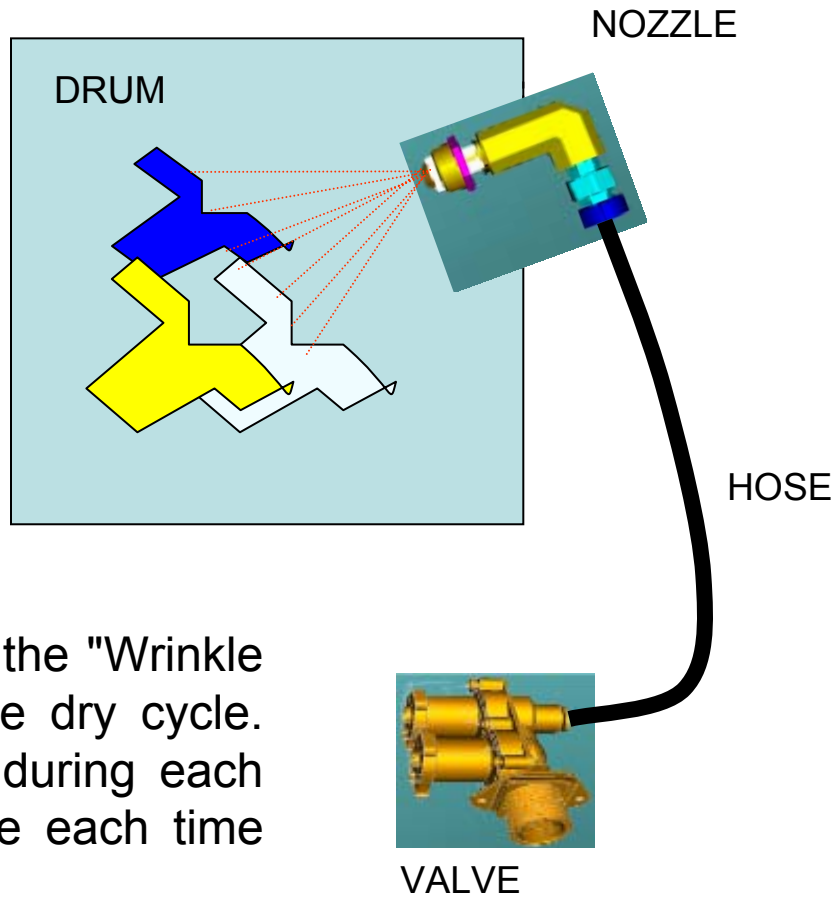
Valve flow rates : 200cc/Min ± 100cc (100~300cc)

Water pressure :1-8kg/cm2



Water Valve Function

Steam System Function



The steam feature is active during the "Wrinkle Care" and "Refresh" stages of the dry cycle. The water valves come on twice during each cycle and stays open for 1 minute each time

Refresh Cycle

Time	Time and Control Temp.											
	Soft keep	1st Spray Cycle	1st Heating Cycle			2nd Spray Cycle			2nd Heating Cycle			Cooling Cycle
	Time	Time	Time	Control Temp.		Time	Control Temp.		Time	Control Temp.		Time
				Heater Off	Heater On		Heater Off	Heater On		Heater Off	Heater On	
15 min	30 sec	1 min	4 min	147 °F	133 °F	30 sec	147 °F	133 °F	8 min.	147 °F	133 °F	1 min

The timing of the water valves and the temperature of the drum area are carefully controlled

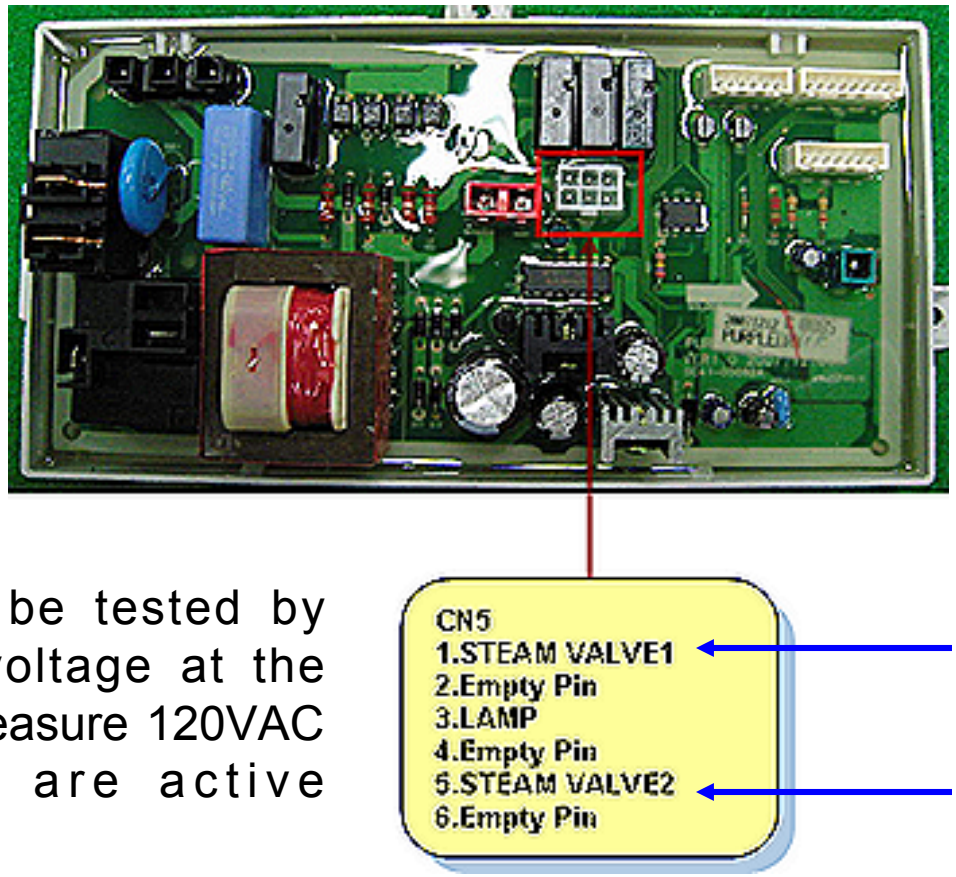
Wrinkle Care Cycle

Time	Time and Control Temp.															
	1st Heating Cycle			1st Spray Cycle			2nd Heating Cycle			2nd Spray Cycle			3rd Heating Cycle			Cooling Cycle
	Time	Control Temp.		Time	Control Temp.		Time	Control Temp.		Time	Control Temp.		Time	Control Temp.		Time
		Heater Off	Heater On		Heater Off	Heater On		Heater Off	Heater On		Heater Off	Heater On		Heater Off	Heater Off	
20 min	1 min	136 °F	122 °F	1 min	136 °F	122 °F	1 min	136 °F	122 °F	1 min	136 °F	122 °F	13 min	136 °F	122 °F	3 min

The timing of the water valves and the temperature of the drum area are carefully controlled

Water Valve Troubleshooting

Main Board



The Water valves can be tested by measuring the output voltage at the connector. This should measure 120VAC when the solenoids are active

Water Valve Troubleshooting

What may seem like a water valve problem may be a clogged spray nozzle. Dirt or mineral build up can clog the nozzle as it has a very fine opening

Water Valve Troubleshooting

After checking for 120VAC on the connectors and checking the wiring harness, remove the connectors from the valves and measure the resistance of the solenoid coils. A good valve solenoid will measure approximately 1.5 kΩ

Removing the Water Valve Assembly

To remove the water valve assembly, the drum must be removed. Remove the 2 screws from the rear of the dryer that secure the valve assembly and remove the valve cover

Removing the Water Valve Assembly

With the valve assembly removed from the dryer, remove the electrical connectors observing which connector goes to which valve. Reverse the order to install the new valve assembly

Chapter 22

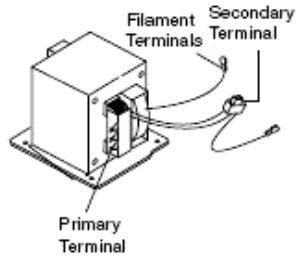
Over the Range Microwave Oven Component Testing and Error Codes

Testing Components

Precaution

1. High voltage is present at the high voltage terminals during any cook cycle.
2. It is neither necessary nor advisable to attempt measurement of the high voltage.
3. Before touching any oven components or wiring, always unplug the oven from its power source and discharge the high voltage capacitor.

High Voltage Transformer

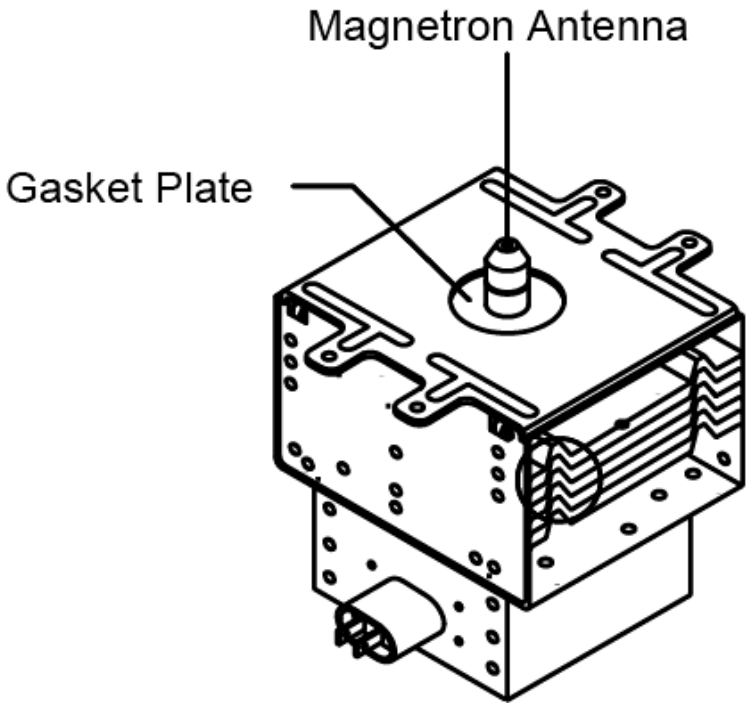
Components	Test	Results
Transformer 	1. Remove wire leads. 2. Measure resistance. (ohm meter scale: Rx1) • Primary winding	 Approx. 0.410+2% ohm. 0.475+2% ohm.
	• Secondary winding	Approx. 129.5+2% ohm.
	• Filament winding	0 ohm.
	3. Measure resistance. (ohm meter scale: Rx1000) • Primary winding to ground • Filament winding to ground	 Normal: Infinite. Normal: Infinite.

Testing Components

Magnetron *

Continuity checks on magnetron can indicate an open filament and shorted magnetron.

1. Isolate the magnetron (disconnect from circuit).
2. A continuity check between input terminals of the magnetron of 1Ω or less is normal, ∞ (infinity) is Open.
3. A continuity check between the case of magnetron and one of input terminals of magnetron indicates ∞ (infinity) is normal, 10Ω or less indicates a Short.

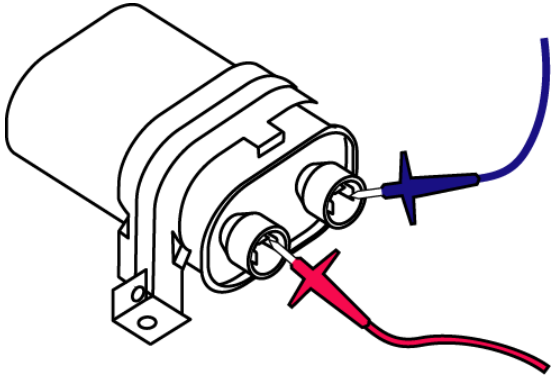


*Never come in contact with the Magnetron Antenna as it will cause premature failure.

Testing Components

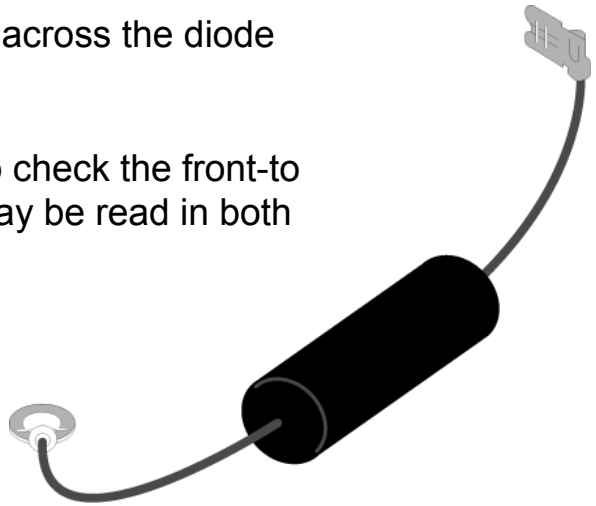
High Voltage Capacitor

1. Check continuity of the capacitor with the meter set at the highest resistance scale.
2. Once the capacitor is charged, a normal capacitor shows continuity for a short time, and then indicates 9MΩ.
3. A shorted capacitor will show continuous continuity.
4. An open capacitor will show 9MΩ constantly.
5. Resistance between each terminal and chassis should read ∞ (infinite).



High Voltage Diode

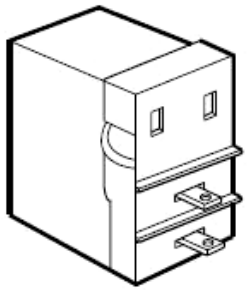
1. Isolate the diode from the circuit by disconnecting its leads.
2. With the ohm-meter set at the highest resistance scale, measure across the diode terminals.
3. Reverse the meter leads and read the resistance.
   A meter with 6V, 9V or higher voltage batteries should be used to check the front-to back resistance of the diode. (Otherwise, an infinite resistance may be read in both directions.)
4. The resistance of a normal diode will be infinite in one direction and several hundred KΩ in the other direction.



Testing Components

∞ = Open ○ = Closed

Power Relay



1. Measure continuity.
   (ohm meter scale: Rx1)
2. Remove the lead wires and operate oven at power level 1 through power level 10.

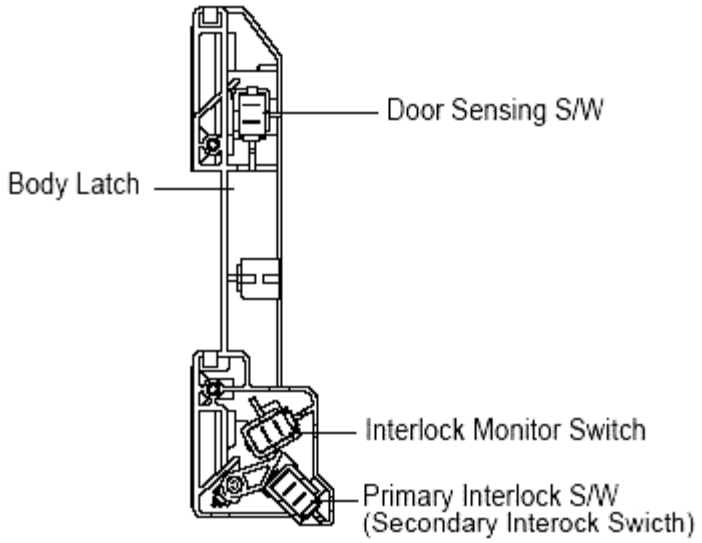
Power Level	∞ ○	∞ ○
1	4 Sec	26 Sec
2	7 Sec	23 Sec
3	10 Sec	20 Sec
4	13 Sec	17 Sec
5	16 Sec	14 Sec
6	19 Sec	11 Sec
7	22 Sec	8 Sec
8	25 Sec	5 Sec
9	28 Sec	2 Sec
10	30 Sec	0 Sec

Testing Components

Adjustment of Primary switch, Door sensing switch and monitor switch Precaution

For continued protection against radiation hazard, replace parts in accordance with the wiring diagram and be sure to use the correct part number for the following switches : Primary and secondary interlock switches, and the interlock monitor switch (Replace all together). Then follow the adjustment procedures below. After repair and adjustment, be sure to check the continuity of all interlock switches and the interlock monitor switch.

1. When mounting Primary switch and Interlock Monitor switch to Latch Body, consult the figure.
2. No specific adjustment during installation of Primary switch and Monitor switch to the latch body is necessary.
3. When mounting the Latch Body to the oven assembly, adjust the Latch Body by moving it so that the oven door will not have any play in it. Check for play in the door by pulling the door assembly. Make sure that the latch keys move smoothly after adjustment is completed. Completely tighten the screws holding the Latch Body to the oven assembly.
4. Reconnect to Monitor switch and check the continuity of the monitor circuit and all latch switches again by following the components test procedures.
5. Confirm that the gap between the switch housing and the switch actuator is no more than 0.5mm when door is closed.
6. Interlock Switch Replacement - When replacing faulty switches, be sure switch mounting tabs are not bent, broken or otherwise deficient in their ability to secure the switches in place.



	Door Open	Door Closed
Primary Interlock switch	∞	0
Monitor switch(COM-NC)	0	∞
Monitor switch(COM-NO)	∞	0
Door Sensing S/W (Secondary Interlock S/W)	∞	0

Checking For M/W Leakage

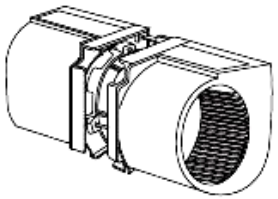
Procedure for measurement of microwave energy leakage

1. Pour ≈10 Oz. of water at 68° F in a microwave safe container and place in the center of the oven.
2. Start to operate the oven and measure the leakage by using a microwave energy survey meter.
3. Set survey meter with dual ranges to 2,450MHz.
4. When measuring the leakage, always use the 2 inch spacer cone with the probe.
   Hold the probe perpendicular to the cabinet door.
   Place the spacer cone of the probe on the door and/or cabinet door seam and move along the seam. The door viewing window and the exhaust openings moving the probe in a clockwise direction at a rate of 1 inch/sec.
   If the leakage test of the cabinet door seam is taken near a corner of the door, keep the probe perpendicular to the areas making sure that the probe end at the base of the cone does not get closer than 2" to any metal. If it is closer than 2", erroneous readings may result.
5. Measured leakage must be less than 4mW/cm2 after repair and adjustment.

   Maximum allowable leakage is 5mW/cm2.
   4mW/cm2 is used to allow for measurement and meter accuracy.

Testing Components

Ventilation Motor



1. Remove wire leads.
2. Measure resistance.
   (ohm meter scale: Rx1)

Turbo: Azure and white wire

Hi: Violet and white wire

Lo: Yellow and white wire

Turbo:

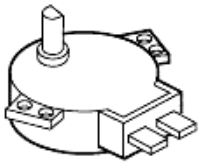
Approximately 21.0 Ω

Hi:

Approximately 45.5 Ω

Synchronous Motor (Stirrer and Turntable Motor)

Synchronous Motor



1. Remove wire leads.
2. Measure resistance.
   (ohm meter scale: Rx1000)

Normal:

Approximately

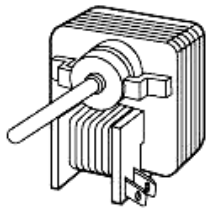
Stirrer	T/T
120Ω ±10%	120Ω ±5%

Abnormal:

Infinite Ω

Testing Components

Fan Motor



1. Remove wire leads.
2. Measure resistance.
   (ohm meter scale: Rx1)

Normal:

Approximately

Fan
32Ω ± 7%

Abnormal:

Infinite Ω

MWO Error Codes part 1

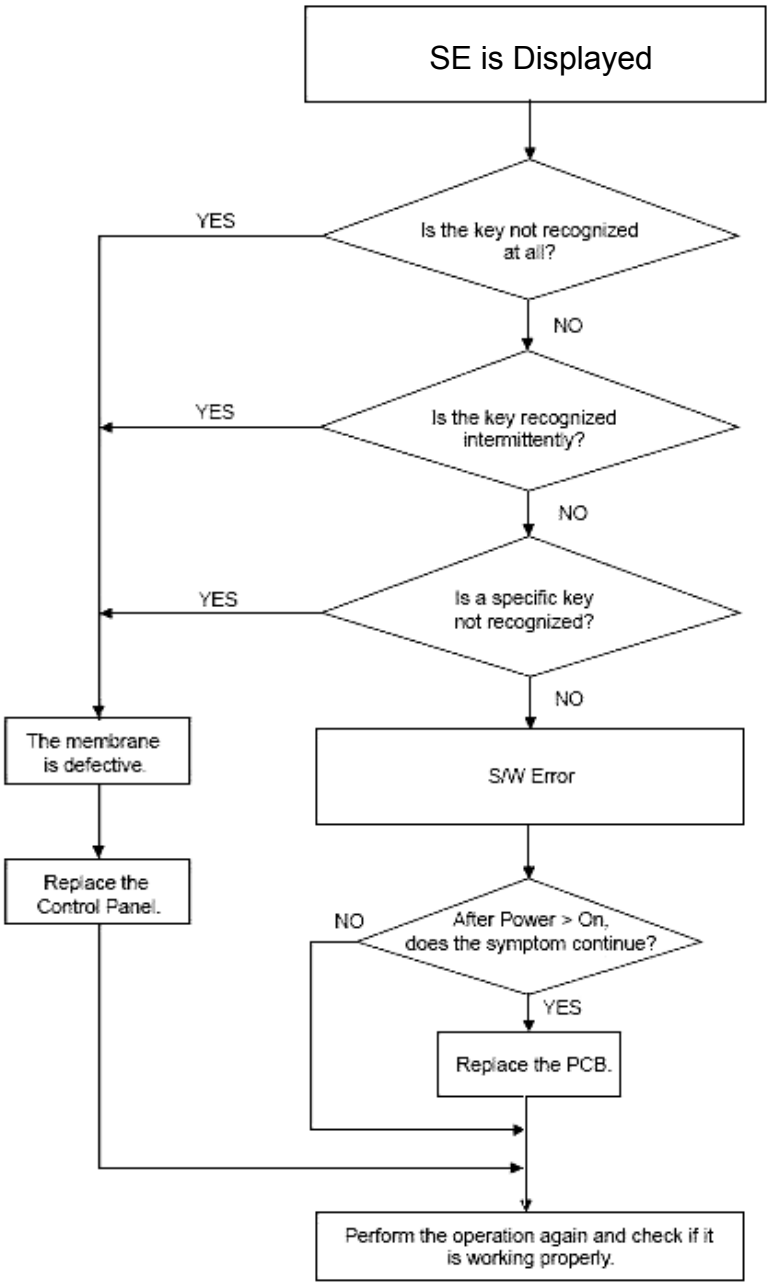
Failure Code	Cause
E-11 Open E-12 Short E-13 T1 Max Time Error E-14 Dry Up / No Load	Error Code Gas Sensor Error Case (E-1X)
E-21 Open E-22 Short E-23 T1 Max Time Error (Preheating not completed) E-24 Over temperature error E-25 Abnormal temperature is sensed at Micro Cook E-26 Temperature is not over the fixed AD in first 3 minutes after cooking by heater starts.	Error Code Temp. Sensor Error Case (E-2X)
E-31 Open (When value of HEX is above “FF” for 5 seconds) E-32 Short E-33 The initial value of HEX is under “14” for 30 seconds while a weight sensor in operation. E-34 The initial value of K calculated by a weight sensor is above and under “±28” as value of HEX. E-35 The value of A is “-” as a weight sensor calculates. E-36 In case the door opens during sensor cooking.	Error Code Gas Sensor Error Case (E-1X)
E-41 Open E-42 Short E-43 T1 Max Time Error E-44 Dry Up E-45 Cooling Error (3minutes) E-46 Primary Open Error(3minutes) E-47 The door opens during cooking	Error Code Easy/PH Sensor Error Case (E4)

MWO Error Codes part 2

Failure Code	Cause
E-51 Open (Sense Failure) E-53 Read/Write Error E-54 Zero not to be set	Error Code EEPROM Error Case (E-5X)
E-61 Open E-62 Short E-63 T1 Max Time Error	Error Code Humidity Sensor Error Case (E-6X)
-SE- Key Short Error (10 seconds) E-01 Door opens when the door should not be opened. E-02 Cooking Time Setting Over Error (MWO) E-03 Cooking Time Setting Over Error (Grill) E-04 Cooking Time Setting Over Error (Convection) E-05 Cooking Time Setting Over Error (Combination) E-06 It fails to sense that the swing heater has stopped for 20 seconds during cooking. E-08 In case function of MWO starts with spit inserted into cavity inside. E-09 The damper is not set to be positioned for 2 minutes.	Error Code Others (E-0X, Letter)

Error Codes

KEY	General Functions
-SE-	Key short Error (10 seconds). Replace the touch pad



Error Codes

E	-	1	1

DEVICE	ERROR CASE
0- Others	1- Open
1- Gas Sensor	2- Short
2- Temp. Sensor	•
3- Weight Sensor	•
4- Easy/PH Sensor	•
5- EEPROM	

Chapter 23

Electric Range Error Codes and Troubleshooting

Error Codes

To check for error codes press "1" and "0" simultaneously for 5 seconds. To exit press "1" and "0" again for 5 seconds.

E-27	Oven Sensor Open > 2950Ω	1. Measure the sensor resistance at room temperature (77° F) from the main PCB. It should measure 1080Ω.
E-28	Oven Sensor Shorted < 940Ω	2. If no problem is found check wiring and connector for loose or frayed connections.
E-08	Oven Heating Error If oven temperature does not reach 100°F in 30 minutes	1. Check oven sensor 2. Check broil, bake and convection heaters. 3. Check heater relay operation 4. Check connections
E-0A	Oven Over Heating If oven temperature is more than 650°F During normal cooking (not cleaning function)	

Error Codes

SE	Shorted or Stuck Key	1. Check if keypad cable is connected properly 2. Check key pad cable for shorts 3. If cable checks OK replace main PCB
E-0E	Door Locking Error * To manually control the lock out mechanism press the “Cooking Time” and “Delay Start” buttons for 3 seconds.	1. Check wiring harness and connectors from door lock switch and solenoid 2. Check the resistance of the solenoid windings 3. While trying to lock the door, measure the voltage on the connector. Should measure 120VAC
E-0d	Abnormal Cleaning Mode If cleaning mode continues for more than 2 hours, over heating will occur	Check oven temperature sensor

Fault Codes

F1	Key held down too long or is shorted	1. Check connections 2. Replace keypad 3. Replace control PCB
F2	Door lock malfunction	1. Check connections 2. Check latch micro switch and latch mechanism 3. Check latch motor
F3	Oven temperature sensor open	See E-27 Sensor should measure ≈ 1080 Ω at 77°F
F 4	Oven temperature sensor shorted	See E-28 – Disconnect the sensor connector and measure the resistance across the pins of the connector. Measure the sensor to chassis ground to determine if the sensor is shorted to ground indicating a frayed wire touching the chassis. If no fault is found replace the main PCB.

Fault Codes

F5	Warming Drawer temperature sensor shorted	Disconnect sensor from main PCB Measure the resistance of the sensor at the connector. The sensor should read 50kΩ @ 77° F Measure the sensor connections to chassis ground. The resistance should be ∞. Anything less would indicate frayed wiring touching chassis ground.
F6	Warming Drawer temperature sensor open	
F7	Oven Heating Error If oven temperature does not reach 100°F in 30 minutes	See E-08
F9	Oven Over Heating If oven temperature is more than 650°F During normal cooking (not cleaning function)	See E-0A

Troubleshooting

PROBLEMS	POSSIBLE CAUSES & FAULTS	SOLUTIONS
Electronic Timer will not accept programming	Defective main power PCB	Replace main power PCB
Electronic Timer will not accept programming	Defective main power PCB	Replace main power PCB
Clock and Timer not working	Power failure	Verify Circuit breaker is not tripped or fuse is not open Refer to owner's manual
Oven does not bake (set to BAKE or TIMED BAKE)	Loose or defective wiring Defective heating element Defective Electronic timer Door switch sensing error	Verify that all connections are clean and tight, replace/repair broken wire if needed Replace defective heating element Replace power control PCB Test the door switch for proper contact with the oven door
Oven does not Broil	Loose or defective wiring Defective heating element Defective power control PCB	Verify all connections are clean and tight, repair/replace broken wiring Replace defective heating element Replace power control PCB
Overheating or "runaway" oven	Loose or defective wiring to the latch Defective oven sensor Defective power control PCB	Repair or replace wiring Replace oven sensor Replace power control PCB
Oven door will not open or latch	Defective latch mechanism Defective (bent) door latch lever Oven is too hot to open	Replace door latch system Replace latch lever Normal condition. Wait until LOCK icon goes out
Premature burnout of bake heating element	Improper use of oven Ex. Used to heat the room	Use oven for purpose intended only
Oven door difficult to open	Worn or broken broil stop roller	Replace oven door hinge

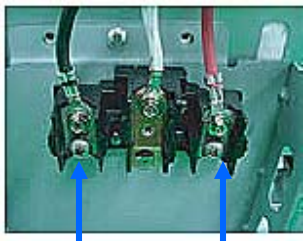
ApplianceTechnical

Troubleshooting Part 1

PROBLEMS	POSSIBLE CAUSES & FAULTS	SOLUTIONS
Oven door sagging on one side	Oven door hinge loose or out of position	Adjust or replace oven door hinge
Oven door does not close completely at the top	Broken or misadjusted door spring Door is too tight on the bottom	Adjust or replace door hinges
Oven door glass breaks	Oven racks covered with foil Glass installed backwards	Remove foil from the racks Install tempered glass toward the heat (inside the oven)
Damaged oven door gasket	Improper self clean	Do not use abrasives or scouring pads (see owners manual)
Oven racks too tight	Racks were cleaned in self clean mode Dirt/grease build up on oven liner	Apply a small amount of vegetable oil to a paper towel and wipe the edges of the racks. Do not spray with Pam or other spray on lubricants
Oven smokes or has an odor the first few times of usage	This is a normal condition	Minor smoking or odors are normal the first few times the oven is used. Use the self clean cycle and ventilate while cleaning
Excessive smoke during self clean	Excessive dirt/grease	Cancel the self clean mode and remove excess grease
Convection fan makes noise	The convection fan will turn on and off, some noise is normal Loose nut on fan blade Bent/deformed fan blade	Low level noise is normal Tighten the nut on the fan blade Replace fan
Failure codes	Electronically controlled	Refer to “failure codes”
Oven temperature incorrect	Oven sensor needs to be adjusted	See owners manual for adjusting temperature sensor

ApplianceTechnical T

Troubleshooting Part 2



208/240 VAC

No power or no display

Check terminal block voltage 240/120 VAC or 208/120 VAC

NO → Reset circuit breaker

OK

Thermostat check

OPEN → Replace Thermostat

OK

Check the voltage on CN08 or CN09 120 VAC

OK

Check the voltage on CN10
PIN 1-2 (RED) 15V
PIN 1-5 (Yellow) 8V

Reseat connector
Repair wiring harness
Check varistor ZNR1 on the main PCB

Check the low voltage transformer

Troubleshooting Part 3

Measure the voltage and resistance of the transformer using the chart in Figure 1

OK

Measure the voltage regulators
IC02 (7812) 12 VDC
IC03 (7805) 5 VDC

NO

Replace regulators or main PCB

Section	Color	Voltage	Resistance
Primary	White	120 VAC	75 to 80 Ω
Secondary 1	Red	16 VAC	1.5 to 2.5 Ω
Secondary 2	Yellow	8 VAC	0.8 to 1.5 Ω

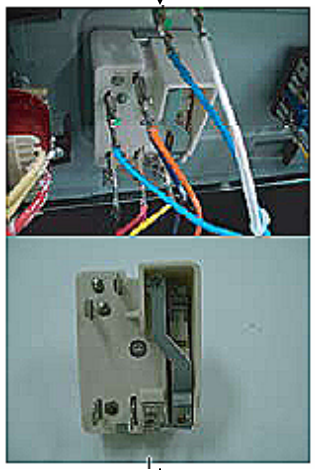
Figure 1

*NOTE – If the resistance reads ∞ the thermal fuse internal to the transformer is open

Troubleshooting Part 4

LR Cook top heating element not working

Check the LR regulator switch for loose connections and Damaged wiring harness



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Position	Wire Color	Remarks
3-L1	Black	240 V 1250 W
5-L2	Red	NL811226 single switch Invensys Co.
4-H2	Yellow	
2-P	Blue	
1-H1	Orange/Violet	

Troubleshooting Part 5

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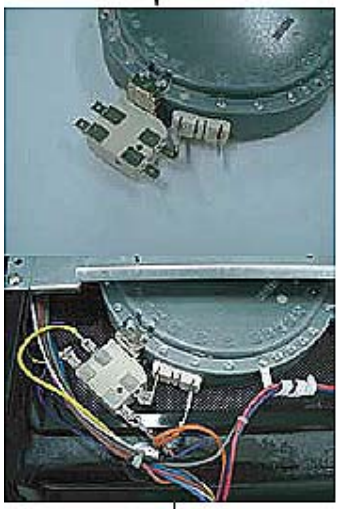
Check the LR Radiant heating element for loose connections

↓



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Position	Resistance
1b-2b	∞
2a-A	15-50 Ω

⚠WARNING

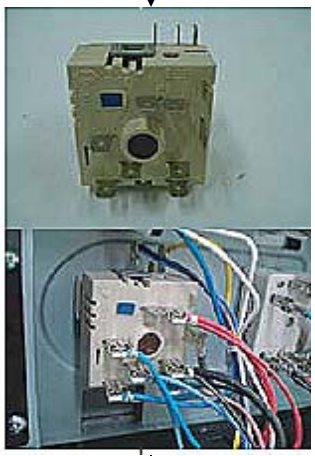
It is dangerous when the radiant heating element is working and the wiring harness is loose or disconnected

Position	Wire Color	Remarks
A	Orange/Violet	240 V 1200W 165N8-L6871R single element Ceramaspeed Co.
2a	Yellow	
1b	Black/Brown	
2b	Yellow	

Troubleshooting Part 6

RF Cook top heating element not working

Check the RF regulator switch for loose connections and Damaged wiring harness



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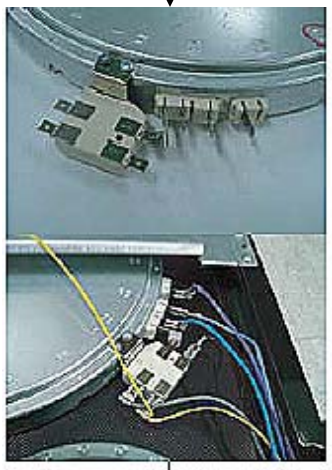
Position	Wire Color	Remarks
P1	Red	240 V 15A 5D.67079.920triple switch E.G.O. Co.
2	Gray	
P2	Black	
S1	Black/Brown	
4A	Sky	
S2	Blue	
4	Blue/Sky	
4 (upper)	Yellow	
4b (upper)	Sky/Violet	

Troubleshooting Part 7

Continued from previous page

Check the RF Radiant heating element for loose connections



Position	Resistance
1b-2b	∞
2a-A	48 - 55 Ω
2a-B	48 – 55 Ω
2a-C	70 – 75 Ω

⚠ WARNING

It is dangerous when the radiant heating element is working and the wiring harness is loose or disconnected

Position	Wire Color	Remarks
A	Blue	240 V 15 A
B	Sky	1200/2200/3000 W 300P8-L8282R Triple element Ceramaspeed Co.
C	Violet	
1b	Black	
2b	Yellow	
2a	Gray	

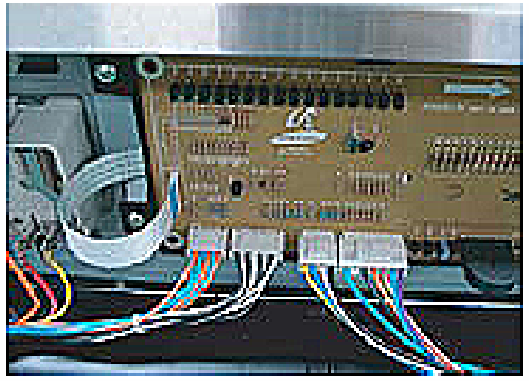
Troubleshooting Part 8

RC Cook top heating element not working

Check warming zone relay RY07 on the Sub PCB

Check foil pattern on PCB for shorts or damage
Check RY07 for damage

Check wiring harness to Sub PCB



Check harness and connectors CN04 & CN05 on the main PCB and Sub PCB

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Troubleshooting Part 9

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Check wiring harness and condition
Of the RC radiant heating element

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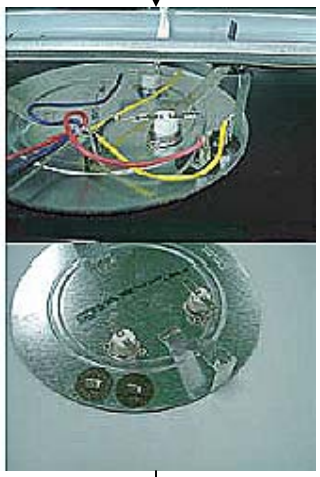

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Position	Resistance
A-B	500 – 600
C-D	∞
E-F	Continuity

(at room temperature)

⚠ WARNING

It is dangerous when the radiant heating element is working and the wiring harness is loose or disconnected

Position	Wire Color	Remarks
A	Red/Yellow	240 V 100 w 3180N9-8233D Warmer Heater Ceramaspeed Co.
B	Yellow/Red	
C	Black/Gray	
D	Gray Yellow	
E	Yellow/Violet	
F	Violet/Yellow	

The End